1968 proceedings

of the

NATIONAL BRUCELLOSIS COMMITTEE

and

progress report

of the

COOPERATIVE STATE-FEDERAL BRUCELLOSIS ERADICATION PROGRAM

Agricultural Research Service · U.S. Department of Agriculture

CONTENTS

The tables are reproduced essentially as they were supplied by the writer of each paper.

Issued July 1968

The annual meeting of the National Brucellosis Committee was held in Omaha, Nebr., on February 27, 1968, to review progress and to recommend improved procedures for the eradication of brucellosis from animals and man. Photographs define how various States are implementing recent changes in procedures.

The proceedings of this meeting are published jointly with the Progress Report of the Cooperative State-Federal Brucellosis Eradication Program to consolidate information pertaining to the brucellosis eradication effort.

OFFICERS OF THE NATIONAL BRUCELLOSIS COMMITTEE

Chairman: J. W. Ralph Bishop
Vice-chairman: J. B. Finley
Secretary: R. Harvey Dastrup
Assistant Secretary: Mike Bay

Executive Committee

Herman Aaberg	C. A. Manthei
J. W. Ralph Bishop	S. H. McNutt
W. D. Knox	J. H. Steele
J. B. Finley	Archie Wilson

Board of Directors

1968	1969	1970	1971
Graham Coulter	Paul Zillman	Herman Aaberg	Mike Bay
R. Harvey Dastrup	M. D. Mitchell	J. W. Ralph Bishop	J. W. Ralph Bishop
James Nance	W. D. Knox	Oral D. Corson	Oral D. Corson
T. A. Ray	C. F. Neumann	James R. Hay	James R. Hay
E. A. Schilf	Lyle V. Springer	N. B. McCullough	N. B. McCullough
W. E. Smith	Jean V. Smith	William Rothenberger	William Rothenberger
D. E. Valine, Sr.	Leo Welder	Charles G. Scruggs	Charles G. Scruggs
Archie Wilson	R. F. Sneddon	James H. Steele	James H. Steele

NATIONAL BRUCELLOSIS COMMITTEE
(Sponsored by Livestock Conservation, Inc.)

AGRICULTURAL RESEARCH SERVICE, USDA: E. A. Schilf, W. F. Hansen, Jr., W. C. RAY, Mike Bay

AMERICAN AGRICULTURAL EDITORS ASSOC.: C. G. Scruggs

AMERICAN ANGUS ASSOCIATION: Lyle V. Springer

AMERICAN FARM BUREAU FEDERATION: Herman C. Aaberg

AMERICAN MEAT INSTITUTE: Paul Zillman

AMERICAN MEDICAL ASSOCIATION: Raymond L. White

AMERICAN NATIONAL CATTLEMEN'S ASSOCIATION: Bob Laramore

AMERICAN VETERINARY MEDICAL ASSOCIATION: James R. Hay

ASSOCIATION OF LAND GRANT COLLEGES AND UNIVERSITIES: S. H. McNutt

FEDERAL EXTENSION SERVICE, USDA: H. G. Geyer

HOARD'S DAIRYMAN: W. D. Knox

INDIANA PORK PRODUCERS ASSOCIATION: J. W. Ralph Bishop

LIVESTOCK CONSERVATION, INC.: R. Harvey Dastrup

MONTANA LIVESTOCK SANITARY BOARD: Archie Wilson

NATIONAL ASSOC. OF STATE DEPARTMENTS OF AGRICULTURE: William L. Henning

NATIONAL INDEPENDENT MEAT PACKERS ASSOCIATION: John A. Killick

NATIONAL INSTITUTES OF HEALTH, U.S. Dept. of Health, Education, and Welfare, N. B. McCullough

NATIONAL LIVESTOCK AND MEAT BOARD: Carl F. Neumann

NATIONAL MILK PRODUCERS FEDERATION: Mack Gebert

NATIONAL PORK PRODUCERS COUNCIL: William Rothenberger

PUREBRED DAIRY CATTLE ASSOCIATION: J. F. Cavanaugh

TEXAS AND SOUTHWESTERN CATTLE RAISERS ASSOCIATION: Leo Welder

U.S. LIVESTOCK SANITARY ASSOCIATION: Jean V. Smith

PUBLIC HEALTH SERVICE, U.S. Department of Health, Education, and Welfare, James H. Steele, W. Max Decker

1968 Proceedings of the National Brucellosis Committee and Progress Report of the Cooperative State-Federal Brucellosis Eradication Program

THE COOPERATIVE STATE-FEDERAL BRUCELLOSIS ERADICATION PROGRAM, A PROGRESS REPORT

by
W. C. Ray [1]

We recognize that brucellosis can be eradicated and are convinced that it can be eradicated by 1975, but we must avoid complacency and procrastination and be willing to adapt to changing conditions as the program advances toward the final goal.

To assure that this goal is attained, it is imperative that the available funds and the available manpower be used wisely in an effective and realistic program to eradicate the disease. Certainly, with only 7 years until 1975, much remains to be done to eliminate brucellosis from all species of animals in the Nation. Improvements in the current methods, exploration of new methods, and most important, continued support by the livestock industry, the veterinary profession, and the responsible regulatory personnel, firmly committed to a philosophy of eradication, are the key to success.

Certified Bovine Brucellosis-Free Area

It is encouraging that the modified certified States are not satisfied with an intermediate goal and continue to work dilligently toward free status. Both Michigan and New York completed the certification requirements in their remaining counties to gain Statewide Certified Brucellosis-Free status near the end of 1967. There are now 12 States plus the Virgin Islands in this select group. The addition of two major dairy States demonstrates that brucellosis eradication is feasible and attainable. All but 8 of the 42 certified States and territories have qualified one or more counties as free areas, and there are many areas in the other States which may qualify for free status during 1968.

Last year, there was an increase of 184 Certified Brucellosis-Free Counties. This is a 24 percent increase since December 31, 1966. The total number of Certified Brucellosis-Free Counties now stands at 942, which is nearly 30 percent of the Nation's counties. The rate of progress in achieving free status is somewhat disappointing, however, since the number of counties attaining free status has declined over the last 3 years. In 1965, there were 226 newly certified-free counties; in 1966, 195 counties achieved free status, whereas last year only 184 counties were certified free of bovine brucellosis. This trend must be reversed if the remaining 2,211 counties are to gain certified-free status within the next 7 years. We are confident that this can be accomplished, but it may take a little extra effort in some areas to meet this goal.

---

[1] Chief Staff Veterinarian, Brucellosis Epidemiology, Cattle Diseases, Animal Health Division, Agricultural Research Service, U.S. Department of Agriculture, Hyattsville, Md.

Modified Certified Areas

Again, the number of areas achieving initial certification was less than that which progressed from a modified certified to a certified-free status. During this last year, only 95 counties completed this area work to receive recognition as certified areas. This included the last area in Alabama, thus moving the number of States in the certified group to 40 plus the Virgin Islands and Puerto Rico. Alaska is also included in this total, having completed its testing in 1967. There are now 2,909 certified counties in the Nation, leaving only 244 counties or 7.7 percent of the Nation's counties to complete initial testing for brucellosis certification.

Noncertified States

A situation report on the 10 remaining noncertified States is in order to reflect the tremendous effort being made within these areas to complete the initial step toward eradication. There are 794 counties in these States and 550 or 69 percent are recognized as modified certified areas. All but 91 of the 244 noncertified counties are under test for initial certification. The infection rate in some of the areas under test is relatively high and the testing conditions are not always favorable, but there is a strong possibility that six or seven States will complete all of the initial testing necessary for certification during this coming year. A State-by-State summary will illustrate the extent of the progress which is being made in these areas.

Colorado

The last two noncertified counties in Colorado have been submitted for certification since the first of the year.

Florida

In 1967, 12 new counties were certified, raising the number of certified counties in Florida to 44. By December 31, 1967, 13 counties were engaged in an area test program and petitions had been received from four additional counties. Only a few herds remain to be tested in many of the counties under area test.

The number of reactors found in Florida last year increased by 82 percent or nearly double the number found in 1966. This can be directly related to the increased testing activity with greater use of the brucellosis card test to detect infected animals with low agglutination titers. The reactor rate for cattle blood tested increased about five-tenths of 1 percent, but the number of retests needed to qualify a herd for release of quarantine decreased nearly 50 percent.

There are five counties where petitioning for area certification has not been completed. Resistance of a few large herd owners has prevented acquiring an adequate percentage of the cattle population in spite of the fact that the majority of owners desire a program.

Hawaii

Only one county remains to be certified in Hawaii. The infection rates for the last 2 years have been very low. In 1967, brucellosis ring tests were conducted four times on samples from all commercial dairy herds; and all adult slaughter cattle were sampled under the market cattle testing program. This screening, plus on-the-farm testing, disclosed only 13 market cattle reactors and only seven infected herds with 11 reactors to the blood test. It is anticipated that Hawaii will be able to complete requirements for modified certified status this year.

Louisiana

All of the remaining noncertified counties are engaged in an intensive area test program. Last year, more reactors were found in Louisiana than in any other State, and the volume of work is tremendous. There were over 3,000 herds under quarantine at the beginning of 1967. The brucellosis card test is widely used and has resulted in reducing the number of retests needed to release herds from quarantine. Louisiana expects to complete initial certification during fiscal year 1968.

Mississippi

The program in Mississippi is also progressing rapidly. All of the noncertified areas are being area tested using the market cattle testing program results to maximum advantage. Extensive use of the brucellosis card test has been valuable in reducing the number of retests on infected herds, thus speeding up the elimination of infection.

Nebraska

Nebraska is relying heavily upon the market cattle testing program to qualify individual herds in the western counties. The increase in testing has supported earlier appraisals indicating that the incidence of brucellosis in Nebraska is relatively low. Nebraska should not have any difficulty qualifying these areas provided the market cattle test coverage is continued at a high level.

Oklahoma

All but nine counties in Oklahoma are either certified or under an area testing program. Market cattle testing has been useful in combination with an effort to test all noncovered herds on an area-by-area plan. The recent progress in Oklahoma is very encouraging. However, limited personnel resources have been inadequate to test MCT suspicious herds until area work is begun in a county.

South Dakota

Area work is underway in all remaining noncertified counties in the State. The incidence of brucellosis is very low; it is not anticipated that any difficulty will be encountered in the entire State's achieving modified certified status by December 31, 1968.

Texas

All but 97 of the 254 counties in Texas have attained certification. Many counties which petitioned for area testing nearly 2 years ago are now engaged in an intensified market cattle testing program. Another large block of counties is being tested to qualify for certification. The infection rate in east Texas are expected to be relatively high, and the cattle population in this area is relatively concentrated. Continued progress should increase the number of counties gaining initial certification this year.

Wyoming

Only three herds remain to be tested in the last noncertified county in Wyoming. Wyoming could join the list of certified States at any time.

Brucellosis Ring Test

The percentage of suspicious ring tests continues to decrease. Last year only 0.5 percent of the milk ring tests were suspicious. The initial test results of these suspicious herds revealed 3,903 reactors in 1,528 herds. Nearly 21 percent of the herds tested under this program had reactors on the blood test. An average of 2.6 reactors per herd was found with only four States finding more than an average of three reactors on the first test. This seems to indicate that the ring test is sufficiently sensitive to locate infected herds before the disease become widely disseminated within the herd. However, the sensitivity of the test in certain areas may cause an unnecessary workload. In one State, 644 herds were tested to find five herds containing seven reactors on the blood test. In another State, 133 herds were tested to find one herd with only one reactor. These are extreme examples, but they serve to illustrate a point. The ring test cannot be taken for granted simply because our past experience has been satisfactory.

Two years ago, it was reported that certain conditions had adverse effects on the ring test and that the effectiveness of the ring test depended upon recognizing and correcting any deficiencies promptly. There can be no relaxation in our supervision of ring test procedures to detect factors that could cause a less sensitive test, but it is also important to recognize that a highly sensitive test may have an adverse effect.

More States are developing plans to engage in some type of a mastitis screening program and are reverting to fresh milk sample collections to combine the needs for the brucellosis and mastitis programs. The return to fresh samples has increased the number of suspicious ring tests found in many areas without a proportional increase in reactor herds. Various procedures are being used to reduce this effect, but more study is needed to fully understand the problem.

Market Cattle Testing

The new "two color" backtag or "multipurpose" tag was introduced in 1967 to provide identification of all cattle moving through livestock markets to slaughter. This tag was designed to be used by livestock markets as a salestag which would reduce program costs for application. If the tag is applied with the white side up, the cattle are identified for blood sample collection; and if the yellow side is up, the cattle are identified for tuberculosis, without blood collection. Using this system, only the cattle not covered by the brucellosis ring test need to be tagged for blood sampling.

This tag is now used at over 350 markets in 19 States. Further expansion in the use of this tag is expected during the coming year. Adoption of this tag by livestock markets will release funds for other needed program activities by reducing the cost of tagging animals and also be eliminating some of the duplication presently occurring by testing dairy cattle under both the MCT and BRT programs. Elimination of duplicate coverage will not be detrimental since experience has shown that it is extremely rare to locate an infected dairy herd by MCT before it is found under the ring test program.

There was a slight reduction of 50,000 in the number of market samples collected in 1967, compared to 1966; but the reduction of reactors was proportionately larger. Out of the more than 4.6 million animals tested under MCT, 41,412 were classified as reactors. Nearly 12.5 percent of these could not be traced to the herd of origin and a slightly higher percentage were traced to herds already known to be infected. The remaining 30,635 reactors were traced to a herd of origin, but only 12,141 herds were tested resulting in disclosing additional reactors in 4,219 herds or roughly in one-third of the herds tested. Over 22,600 reactors were removed on the first test of these herds.

The efficiency of the brucellosis ring test and the market cattle test for locating reactor herds is extremely high when compared with area testing or tests for all other reasons combined. The failure to successfully trace 12.5 percent of the animals and the inability to follow up on herd tests of an undetermined number of reactors originating in areas not under area test need to be corrected as soon as possible. The advantages of a surveillance system must be exploited to gain maximum benefit of the funds invested.

Many States are using market cattle testing to great advantage. Last year, 41 States screened the adult cow population not covered by BRT at a 5 percent level or greater. Uniformity of coverage on a population within an area is of prime importance, however; and this cannot be assured unless all markets and slaughter plants participate in this program. A continuing analysis of the program operation within each State is needed to detect and improve weak or ineffective areas of operation as quickly as possible. Loss of identity of cattle is only one of the problems which must be considered.

Vaccination

Continued support of a massive vaccination program in all areas cannot be justified. The funds used for vaccinating calves in most of the modified certified areas and all of the certified-free areas are needed to reduce the levels of infection in noncertified areas and to expand and improve surveillance testing and epidemiological studies on infected herds and related problems.

Vaccination is an important method for controlling brucellosis, and there is a definite need for vaccination of calves in areas and herds where risk of exposure is present. However, the controls on movements of exposed cattle by quarantine measures, the frequent and high level coverage of the population at risk by proven surveillance test methods, and the expanding use of epidemiologic principles and methods to study suspicious herds make vaccination a costly insurance program in areas with a low incidence of disease.

The squeeze on available funds for brucellosis eradication work will become more pronounced as time goes on. Under these conditions and with the knowledge that vaccination provides protection for only 65-70 percent of vaccinated animals, that residual vaccine reactions are difficult at best to distinguish from infection titers, and that mature cattle vaccinated as calves are occasionally found to harbor and shed Strain 19 organisms, a new Animal Health Division policy on vaccination was circulated in December 1967. This policy would remove Federal support for use of vaccine in certified-free areas and most modified certified areas unless extenuating circumstances indicate that eradication could be accelerated by using funds for this purpose.

Vaccination has been discouraged, or at least not encouraged, in most of the certified States for the last 3 years and has been encouraged for most of the noncertified States. In 1967, seven certified States vaccinated more than 50 percent of the entire heifer crop, but none of the noncertified States were in this percentage bracket. In fact, the net effect, based upon the percentage of the heifer crop vaccinated in 1966 as compared with 1967, was a decrease in vaccination in five of the noncertified States, no change in another, and only slight increases in the remaining four States. Only Florida, Louisiana, South Dakota, and Wyoming of the noncertified States vaccinated more than 25 percent of the heifer calf crop during 1967.

Epidemiology

Brucellosis epidemiologists are available to every State requiring their services for disease investigations, but not every State has an epidemiologist assigned to its station. These specialists in brucellosis continue to provide a valuable service in evaluating technical aspects of the program.

Last year, reports of a Brucella-like infection in dogs was reported by workers from Cornell University. Although this organism was later classified as a Brucella after extensive study, it is not identical to any of the classic species. Serologically, it does not cause cross reactions with our diagnostic tests for brucellosis of livestock, but its host range is still undetermined. Last fall, we assigned a veterinarian to work under the guidance of the workers at Cornell to investigate the host range and epidemiology of this disease. This project will not be completed for at least another year and a half, but it should provide important information on possible relations between the two conditions.

Following completion of the vaccination study conducted in cooperation with Clemson University, interest in 45/20 bacterins indicated that a further study on this product should be conducted. A cooperative project with Clemson University is underway on the serologic pattern following vaccination of mature cattle with 45/20 bacterin. The results of this project should be available next year.

The movement of cattle from noncertified areas is a constant threat to livestock populations in the certified States. Animals from infected herds have been moved following a negative test and later were found to be infected in the herd of destination. In 1967, over 76 percent of the reactors were found in 11 noncertified States.

Swine Brucellosis

The limited data available indicate that the incidence of swine brucellosis is low. The best information was collected by a national survey conducted at slaughter establishments under Federal inspection during November and December 1966. Randomly selected samples from hogs were collected from each plant on a specified day. Although we cannot assume that the data are applicable to hogs slaughtered at other plants, we can be fairly confident in the results from Federal plants. These results indicate that the incidence of brucellosis is about 0.4 percent in mature swine and about 0.3 in market hogs.

The National Listing of Validated Herds was discontinued last year because it became increasingly difficult to maintain an accurate listing of nearly 2,500 herds. The number of validated counties, however, increased from 127 to 144 during the year. The area validation program needs to be accelerated, but conventional farm-to-farm testing methods are too costly and too slow for consideration in areas of heavy swine concentration. A market swine testing program offers a potential solution for accelerating area validation by locating swine herds suspected of being infected without farm-to-farm testing. In this regard, a pilot project was started in Iowa last fall to study the problems associated with an MST program. The first problem, of course, is developing a suitable method for identifying eligible swine. The slap tattoo is probably the best solution; it is widely used by the packing industry as a means for identification. For our purpose, more digits would be required for coding, and preliminary work on an eight-digit tattoo is highly encouraging.

Other Species

Bison

The reduction of brucellosis in the bison population has been quite phenomenal. An example is Custer State Park. Infection a few years ago, on sampling, appeared to be about 25 percent. Last month, 971 animals were tested with nine reactors, seven adult cows and two young bulls. Similar results have been seen in a large herd in Wyoming which 2 years ago had over 30 percent infection; this winter it was 3 percent. The herd in Yellowstone Park remains a problem.

Reindeer

Testing is being conducted in the controlled reindeer herds, those owned by Eskimos and those under supervision of the Bureau of Indian Affairs in Alaska.

A cooperative project is underway involving the Alaska State Game and Fish Commission, the U.S. Public Health Service, the Bureau of Indian Affairs, and the Animal Health Division, USDA. This will include sampling the roving caribou herds, selecting those animals showing joint lesions for serological test and culture. It is hoped that information can be gained from this project which will permit evaluation of several serological tests in caribou. There are indications that serology may be similar to what is seen in swine; that is, a decrease in titer while the infection remains in the animal. Working conditions in these herds are difficult and completion of the project may require several years.

On the basis of testing currently being conducted, using both standard and supplemental tests to locate infection, the incidence is not as high as may have been expected from early reports. Several thousand reindeer have been tested; the incidence is about 2 percent. The organism involved is Brucella suis type 4.

311-534 O - 68 - 2

SUMMARY OF BOVINE BRUCELLOSIS ERADICATION ACTIVITIES IN COOPERATION WITH THE STATES

CALENDAR YEAR 1966

State or Territory	Brucellosis Blood Tests				Brucellosis Ring Test			Calves vaccinated
	Cattle tested	Reactor cattle			Herd tests	Suspicious herd tests		
	Number	Number	Percent 1/	Percent 2/	Number	Number	Percent	Number
Alabama	377,263	7,634	2.02	1.63	4,333	87	2.0	100,989
Alaska	622	0	0.00	0.00	167	0	0.0	72
Arizona	36,807	202	0.55	0.24	937	6	0.6	12,901
Arkansas	246,377	2,584	1.05	0.86	13,888	82	0.6	111,256
Califorina	199,753	838	0.42	0.09	16,162	300	1.9	400,169
Colorado	128,442	545	0.42	0.28	9,373	76	0.8	132,178
Connecticut	42,702	2	0.01	0.01	5,601	3	0.1	14,612
Delaware	20,709	17	0.08	0.05	1,399	14	1.0	2,390
Florida	393,008	7,032	1.79	1.48	1,901	303	15.9	143,116
Georgia	284,711	3,455	1.21	0.93	6,444	74	1.1	41,924
Hawaii	31,246	75	0.24	0.18	197	0	0.0	10,782
Idaho	93,906	545	0.58	0.24	36,343	152	0.4	174,333
Illinois	286,826	2,756	0.96	0.63	48,482	351	0.7	100,008
Indiana	190,944	668	0.34	0.18	43,635	232	0.5	64,436
Iowa	473,620	3,863	0.82	0.42	96,860	833	0.9	415,124
Kansas	249,933	3,278	1.31	0.67	36,145	214	0.6	350,854
Kentucky	234,079	3,358	1.43	0.77	72,452	1,061	1.5	60,991
Louisiana	582,383	17,578	3.02	2.45	4,596	128	2.8	92,088
Maine	34,339	14	0.04	0.01	5,879	6	0.1	15,493
Maryland	178,929	53	0.03	0.02	14,410	164	1.1	25,235
Massachusetts	26,284	7	0.03	0.01	6,752	10	0.1	12,057
Michigan	177,550	438	0.25	0.08	74,437	995	1.3	116,735
Minnesota	401,909	1,494	0.37	0.10	218,037	317	0.1	187,813
Mississippi	491,757	18,079	3.68	2.67	13,405	332	2.5	127,254
Missouri	396,354	2,831	0.71	0.42	75,423	1,086	1.4	345,922
Montana	130,380	291	0.22	0.19	7,670	21	0.3	281,263
Nebraska	299,533	1,533	0.51	0.33	42,798	122	0.3	428,830
Nevada	29,288	25	0.09	0.07	481	0	0.0	44,057
New Hampshire	46,320	6	0.01	0.01	1,946	16	0.8	8,627
New Jersey	75,324	32	0.04	0.02	5,113	21	0.4	11,090
New Mexico	54,275	213	0.39	0.36	1,237	138	11.2	14,318
New York	95,916	140	0.15	0.01	109,015	93	0.1	214,755
North Carolina	270,101	394	0.15	0.09	21,661	90	0.4	30,565
North Dakota	129,986	1,075	0.83	0.37	38,277	114	0.3	271,228
Ohio	192,432	461	0.24	0.12	80,516	437	0.5	74,305
Oklahoma	881,363	15,408	1.75	1.65	7,722	149	1.9	118,293
Oregon	118,779	219	0.18	0.10	11,809	95	0.8	112,369
Pennsylvania	636,308	479	0.08	0.03	81,560	94	0.1	128,694
Rhode Island	7,503	0	0.00	0.00	1,054	6	0.6	1,151
South Carolina	130,939	468	0.36	0.27	4,862	17	0.3	20,808
South Dakota	386,724	2,053	0.53	0.33	31,605	246	0.8	453,095
Tennessee	237,497	4,717	1.99	1.02	82,358	689	0.8	53,149
Texas	1,101,569	20,733	1.88	1.47	13,515	476	3.5	287,018
Utah	47,073	140	0.30	0.09	13,922	26	0.2	71,060
Vermont	23,976	7	0.03	0.01	18,904	8	0.0	9,028
Virginia	252,208	393	0.16	0.09	39,665	224	0.6	76,401
Washington	135,119	151	0.11	0.05	17,418	138	0.8	34,008
West Virgina	108,618	237	0.22	0.18	9,005	31	0.3	8,064
Wisconsin	277,724	84	0.03	0.01	224,751	182	0.1	474,977
Wyoming	59,858	87	0.15	0.11	2,214	5	0.2	163,505
Puerto Rico	253,528	1,024	0.40	0.30	6,658	202	3.0	1,003
Virgin Islands	1,118	0	0.00	0.00	0	0	0.0	0
TOTALS	11,563,832	127,706	1.10	0.57	1,682,994	10,466	0.6	6,483,393

1/ Percent of cattle infection, blood tests only.

2/ Percent of cattle infection calculated on the basis of total blood tests and actual number of individual BRT negative cattle.

SUMMARY OF BOVINE BRUCELLOSIS ERADICATION ACTIVITIES IN COOPERATION WITH THE STATES

CALENDAR YEAR 1967

STATE OR TERRITORY	CATTLE BLOOD TESTED ON FARM OR RANCH						BRUCELLOSIS RING TESTS						FREQUENCY OF BRT ROUNDS PER YEAR	CATTLE TESTED ON FARM AND BRT NEGATIVE	MARKET CATTLE TESTS		CATTLE TESTED ON FARM AND MCT AND BRT NEGATIVE	CALVES VACCINATED
	TOTAL TESTED		INFECTED HERDS		REACTORS		TESTS	ESTIMATED CATTLE REPRESENTED	SUSPICIOUS TESTS		NEGATIVE TESTS	NEGATIVE CATTLE REPRESENTED			CATTLE	REACTORS		
	HERDS	CATTLE	NUMBER	PERCENT [1]	NUMBER	RATE [2]			NUMBER	PERCENT				RATE [3] CATTLE INFECTION			RATE [4] CATTLE INFECTION	
Alabama	5,609	161,807	1,322	23.6	4,018	248.32	5,251	296,058	97	1.8	5,154	290,404	3	155.37	142,120	1,659	141.66	98,888
Alaska	60	530	--	0.0	--	0.00	227	10,554	--	0.0	227	10,554	4	716.31	245	--	0.00	86
Arizona	780	19,158	24	3.1	91	47.49	859	181,569	22	2.6	837	173,864	4	14.53	14,696	40	16.94	12,821
Arkansas	3,307	75,704	620	18.7	1,953	257.97	14,629	191,260	112	0.8	14,517	189,748	4	158.59	148,498	784	100.75	113,952
California	5,945	91,139	183	3.1	419	45.97	20,733	2,969,774	307	1.5	20,426	2,925,686	4	5.09	77,953	57	5.28	404,018
Colorado	4,079	59,628	144	3.5	521	87.37	8,603	263,201	16	0.2	8,587	262,426	4	41.60	48,022	78	34.57	121,533
Connecticut	2,880	37,707	3	0.1	3	0.79	5,998	151,371	16	0.3	5,982	150,969	4	0.39	--	--	0.39	15,869
Delaware	796	16,871	1	0.1	1	0.59	1,429	50,180	6	0.4	1,423	50,051	4	0.34	1,522	4	1.61	1,826
Florida	11,013	559,535	2,333	21.2	12,854	229.72	1,840	487,443	285	15.5	1,555	356,604	4	198.15	93,398	2,398	205.52	124,321
Georgia	4,634	128,189	853	18.4	2,818	219.83	5,701	228,040	111	1.9	5,590	223,600	3½	146.71	178,361	834	98.58	38,161
Hawaii	258	8,937	7	2.7	11	12.30	211	49,190	--	0.0	211	49,190	4	5.18	14,178	13	6.77	11,130
Idaho	1,064	16,068	63	5.9	203	126.33	33,398	500,970	132	0.4	33,266	498,990	4	14.41	59,366	131	16.68	143,878
Illinois	23,912	215,437	932	3.9	2,396	111.21	55,751	500,839	48	0.1	55,703	500,481	4	70.35	149,053	925	67.82	99,561
Indiana	14,046	139,503	235	1.7	546	39.13	48,824	585,888	158	0.3	48,666	583,992	3	16.33	76,834	286	20.24	63,425
Iowa	38,388	369,402	892	2.3	1,723	46.64	98,614	1,576,071	646	0.7	98,968	1,565,302	3	19.33	199,402	932	24.34	476,285
Kansas	5,803	72,412	507	8.7	1,443	199.27	31,056	621,120	142	0.5	30,914	618,280	3	51.81	159,877	684	48.51	278,602
Kentucky	10,512	131,682	947	9.0	2,109	160.15	62,597	792,569	704	1.1	61,893	783,815	3	53.67	164,943	1,755	69.26	56,109
Louisiana	15,502	422,429	4,578	29.5	20,183	477.78	4,239	258,548	104	2.5	4,135	252,204	2	367.94	168,443	4,269	341.04	89,868
Maine	943	11,656	3	0.3	3	2.57	5,465	223,817	4	0.1	5,461	223,694	3	0.34	16,759	4	0.67	17,368
Maryland	5,246	104,365	22	0.4	22	2.10	14,078	417,534	142	1.0	13,936	411,858	4	1.06	36,007	28	2.05	32,340
Massachusetts	849	15,970	4	0.5	5	3.13	6,300	252,000	19	0.3	6,281	251,240	4	0.63	1,276	--	0.62	12,949
Michigan	9,970	81,474	69	0.7	165	20.25	46,000	1,117,644	464	1.0	45,536	1,109,256	4	4.59	90,623	367	11.83	118,145
Minnesota	18,889	264,383	282	1.5	662	25.03	213,646	4,272,920	194	0.1	213,452	4,269,040	4	4.97	119,760	98	5.23	185,308
Mississippi	19,372	381,058	4,404	22.7	17,762	466.12	12,550	373,710	309	2.5	12,241	364,220	3	353.49	197,307	3,645	305.91	130,579
Missouri	12,997	148,482	766	5.9	1,735	116.84	83,212	1,214,890	1,438	1.7	81,774	1,193,897	4	38.81	232,752	806	37.38	314,962
Montana	1,673	21,797	36	2.2	143	65.60	6,459	64,590	12	0.2	6,447	64,470	4	37.71	95,675	51	14.52	273,502
Nebraska	6,475	133,388	316	4.9	915	68.59	24,936	303,505	77	0.3	24,859	302,580	3	39.06	105,103	215	33.29	426,138
Nevada	163	5,754	10	6.1	18	31.28	489	36,123	1	0.2	488	36,061	4	12.18	9,968	4	8.89	3,089
New Hampshire	3,035	47,071	1	0.1	1	0.21	4,030	150,310	29	0.7	4,001	149,525	4	0.11	114	--	0.11	10,451
New Jersey	2,548	56,561	2	0.1	2	0.35	6,425	202,670	21	0.3	6,404	202,066	4	0.18	--	--	0.18	13,238
New Mexico	1,269	27,759	62	4.9	237	85.37	993	20,946	11	1.1	982	20,678	4	71.97	25,712	88	55.42	11,487
New York	6,937	99,065	40	0.6	46	4.64	103,496	3,311,872	86	0.1	103,410	3,309,120	4	0.49	3,171	4	0.53	233,773
North Carolina	8,996	179,235	231	2.6	399	22.26	20,303	651,430	67	0.3	20,236	649,680	4	11.67	86,999	116	12.01	13,608
North Dakota	2,782	35,856	126	4.5	396	110.44	34,551	556,289	88	0.3	34,463	554,865	3	17.93	100,114	304	21.79	254,555
Ohio	16,645	149,619	186	1.1	400	26.73	93,371	984,070	442	0.5	92,909	979,106	4	10.14	52,505	40	9.84	72,522
Oklahoma	29,783	642,731	5,283	17.7	17,138	266.64	6,997	139,940	80	1.1	6,917	138,340	3	248.79	305,756	5,067	223.25	150,191
Oregon	1,606	23,322	28	1.7	75	32.15	12,481	499,260	67	0.5	12,414	496,560	4	5.08	72,767	61	6.17	99,731
Pennsylvania	29,756	469,887	171	0.6	237	5.04	76,509	2,378,030	106	0.1	76,403	2,375,561	3	1.87	142,860	264	3.56	144,167
Rhode Island	504	4,586	--	0.0	--	0.00	763	30,520	9	1.2	754	30,160	4	0.00	27	--	0.00	1,399
South Carolina	1,934	64,824	54	2.8	219	33.78	4,354	122,460	64	1.2	4,290	120,840	4	23.04	46,862	63	19.87	22,107
South Dakota	11,125	342,282	629	5.7	2,301	67.22	22,440	493,680	120	0.5	22,320	491,040	3	45.47	97,988	353	43.94	501,828
Tennessee	5,001	108,146	858	17.2	2,727	252.15	69,071	759,781	607	0.9	68,464	753,104	4	91.99	116,512	1,101	92.70	24,016
Texas	28,143	747,867	3,979	14.1	12,781	170.89	10,744	752,080	278	2.6	10,466	732,620	3	128.83	511,958	12,914	170.84	270,619
Utah	1,357	25,243	36	2.7	127	50.31	12,623	378,660	34	0.3	12,589	377,580	4	10.61	25,265	35	11.17	62,185
Vermont	1,155	22,338	6	0.5	6	2.68	17,613	560,083	7	0.1	17,606	559,818	4	0.36	108	--	0.36	6,823
Virginia	6,302	123,521	73	1.2	217	17.56	36,723	853,780	309	0.8	36,414	849,690	4	6.45	81,023	122	8.13	75,798
Washington	1,547	14,208	17	1.1	34	23.93	18,424	602,813	113	0.6	18,311	601,127	4	2.06	96,726	46	3.06	28,606
West Virginia	1,886	36,991	22	1.2	69	18.65	8,455	93,005	47	0.6	8,408	92,048	4	11.49	53,425	40	9.60	7,873
Wisconsin	20,825	206,764	27	0.1	47	2.27	244,602	6,359,652	221	0.1	244,381	6,353,906	3	0.20	57,134	--	0.19	496,889
Wyoming	1,112	33,715	43	3.9	82	24.32	1,808	63,280	4	0.2	1,804	63,140	3	14.97	28,168	37	14.31	164,977
Puerto Rico	6,836	179,821	424	6.2	965	53.66	3,734	308,948	215	5.8	3,519	290,312	4	38.23	49,617	119	35.86	--
Virgin Islands	7	1,366	1	14.3	2	18.06	1	105	--	0.0	1	109	--	13.55	416	--	10.57	--
TOTALS	416,256	7,337,243	31,855	7.7	111,230	151.59	1,620,586	38,265,049	8,501	0.5	1,611,995	37,903,471		61.21	4,557,668	40,841	66.90	6,331,556

ANH FORM 4-44A
SEP 1967

[1] Percent of herd infection tested on farm or ranch

[2] Cattle infection rate per 10,000 animals tested based on total cattle tested on farm or ranch

[3] Cattle infection rate per 10,000 animals tested based on total cattle tested on farm and BRT negative tests adjusted for frequency

[4] Cattle infection rate per 10,000 animals tested based on total cattle tested on farm, MCT and BRT negative tests adjusted for frequency

SUMMARY OF BRUCELLOSIS ERADICATION ACTIVITIES IN COOPERATION WITH THE VARIOUS STATES UNDER THE MARKET CATTLE TESTING PROGRAM

CALENDAR YEAR 1966

STATE OR TERRITORY	BACK TAGGING											LABORATORY TESTS								TESTS OF HERDS OF ORIGIN OF REACTORS					COWS FROM OTHER STATES
	TAGS APPLIED AT						TAGS APPLIED BY					COWS ORIGINATING IN THIS STATE								INFECTED			NEGATIVE		
	RANCH OR FARM	PUBLIC STOCK-YARDS	OTHER LIVESTOCK MARKETS	SLAUGHTER ESTABLISH-MENTS	OTHER	TOTAL ANIMALS TAGGED	OWNER-OWNER REPRE-SENTA-TIVE	DEALER	MARKET EMPLOYEES	REGULATORY PERSONNEL	OTHER	TESTING LABS		TOTAL TESTS	RESULTS OF BLOOD TESTS					HERDS	ANIMALS	REACTORS	HERDS	ANIMALS	
												LABS IN THIS STATE	LABS IN OTHER STATES		NEGATIVE	SUSPECT	REACTOR	TOTAL	INFECTION RATE PER 10,000 ANIMALS						
Alabama	-	-	70,909	73	-	70,982	-	-	63	67,513	3,406	111,429	17,064	128,493	125,394	1,585	1,514	128,493	117.8	237	9,008	1,053	382	8,840	6,683
Alaska	-	-	-	-	-	-	-	-	-	-	-	108	13	121	119	2	-	121	0.0	-	-	-	-	-	-
Arizona	1,708	17,441	52,942	-	-	72,091	1,708	-	-	70,383	-	11,381	6,281	17,665	17,323	323	19	17,665	10.8	2	2	2	3	2,405	1,239
Arkansas	-	26,006	290	-	-	26,296	-	-	-	26,296	-	148,349	26,244	174,593	171,362	2,143	1,088	174,593	62.4	212	8,152	662	593	14,001	21,103
California	2,889	-	73,849	41,410	-	118,148	2,675	-	-	115,473	-	89,324	2,304	91,628	88,397	3,071	160	91,628	17.5	20	2,563	140	92	10,883	22,148
Colorado	2,002	27,974	74,998	-	-	104,974	2,002	-	74,050	28,922	-	31,112	11,722	42,834	42,116	632	86	42,834	20.1	11	1,733	99	27	2,349	8,680
Connecticut	-	-	-	-	-	-	-	-	-	-	-	78	187	265	259	6	-	265	0.0	-	-	-	-	-	-
Delaware	486	-	6,337	-	-	6,823	-	-	6,337	486	-	197	1,239	1,436	1,415	15	6	1,436	41.8	1	13	1	-	-	5,214
Florida	1,107	-	89,295	-	-	90,402	1,107	-	-	89,295	-	40,000	6,234	46,234	42,569	1,914	1,748	46,231	378.1	53	2,557	332	45	1,923	4,404
Georgia	-	-	98,465	1,238	93	99,796	-	-	-	98,465	1,331	168,079	5,311	173,383	171,036	1,440	907	173,383	52.3	146	6,001	814	240	6,441	17,634
Hawaii	-	-	-	-	-	-	-	-	-	-	-	16,360	-	16,360	16,042	298	20	16,360	12.2	2	101	35	7	913	-
Idaho	96	-	82,290	2,872	-	85,258	96	-	14,212	68,078	2,872	40,515	28,036	68,551	68,361	12	178	68,551	26.0	23	2,197	162	38	1,085	22,004
Illinois	18	70,315	74,237	2,817	-	147,387	-	165	37,338	109,884	-	72,032	37,480	109,512	105,671	2,857	984	109,512	89.0	88	2,527	314	347	8,258	39,478
Indiana	38	42,048	66,644	1,931	-	110,661	20	18	68,575	42,048	-	47,870	37,615	85,485	81,835	3,417	233	85,485	27.3	18	494	84	113	2,183	18,193
Iowa	459	3,239	178,934	16,216	32	198,880	-	-	-	3,698	195,182	110,402	25,152	135,554	131,581	2,672	1,301	135,554	96.0	88	2,648	376	359	8,999	45,446
Kansas	142	40,066	235,022	-	-	275,230	142	-	154,962	2,602	117,524	89,198	71,990	161,188	154,721	5,197	1,270	161,188	78.8	222	10,983	1,007	354	11,205	30,433
Kentucky	12	74,697	183,058	5,067	-	262,834	12	-	10,741	252,006	75	126,213	84,084	210,297	198,197	9,622	2,478	210,297	117.8	140	4,070	569	624	11,995	34,389
Louisiana	-	-	76,441	20	-	76,461	-	-	76,441	-	20	197,361	26,367	223,728	211,269	6,619	5,840	223,728	261.0	1,330	78,344	5,834	1,493	48,930	16,805
Maine	13,300	73	513	9,025	-	22,911	-	13,300	586	-	9,025	20,574	532	21,106	21,019	73	14	21,106	6.6	-	-	-	12	224	22
Maryland	1,463	22,227	27,469	313	-	51,472	-	1,463	32,251	17,445	313	14,313	19,548	33,861	33,145	664	52	33,861	15.4	-	-	-	8	445	14,384
Massachusetts	-	-	925	-	-	925	-	-	-	925	-	4,380	1,503	5,883	5,461	420	2	5,883	3.4	-	-	-	1	723	835
Michigan	267	18,505	86,728	318	-	105,818	267	30	86,630	386	18,505	52,895	2,980	55,875	50,646	4,971	258	55,875	45.2	3	117	16	137	4,529	20,589
Minnesota	-	230,123	11,700	-	-	241,123	-	-	6,170	15,630	220,323	122,195	10,682	133,177	132,193	824	160	133,177	12.0	5	132	33	86	2,365	63,129
Mississippi	-	-	97,711	1,214	-	98,925	-	-	1,459	97,466	-	203,535	19,355	222,890	215,646	3,290	3,954	222,890	177.4	1,222	55,098	7,627	1,179	31,820	38,614
Missouri	14	130,117	70,154	3,773	-	204,058	-	-	-	-	204,058	181,394	45,538	226,932	222,645	3,387	900	226,932	39.7	139	4,896	571	427	10,102	59,405
Montana	449	14,350	140,704	4,550	-	160,053	400	-	-	159,653	-	57,902	42,286	100,188	97,297	3,088	46	100,431	4.6	13	1,355	107	62	3,575	7,806
Nebraska	1,481	7,914	163,249	24	-	172,668	1,132	-	-	4,462	167,074	115,117	12,843	127,960	126,367	1,203	390	127,960	30.5	30	1,618	95	86	4,653	58,220
Nevada	3,510	-	5,523	-	-	9,033	1,561	-	-	3,957	3,515	3,595	10,460	14,055	14,039	9	7	14,055	5.0	1	119	12	2	365	911
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	-	169	169	166	3	-	169	0.0	-	-	-	-	-	-
New Jersey	-	-	-	-	-	-	-	-	-	-	-	-	10	10	7	1	2	10	2000.0	-	-	-	-	-	-
New Mexico	47	25,560	3,978	-	22	29,607	47	-	-	29,485	75	7,345	9,244	16,589	16,347	178	64	16,589	38.6	5	742	24	12	806	9,602
New York	40	633	3,275	531	-	4,479	40	-	3,579	312	548	3,137	147	3,284	3,093	166	22	3,281	67.1	-	-	-	1	3	6,898
North Carolina	26	-	88,115	179	-	88,320	-	-	19,782	68,377	161	84,955	14,026	98,981	97,946	923	112	98,981	11.3	8	499	67	61	1,705	13,661
North Dakota	73	47,712	121,008	48	422	169,263	73	-	-	84,708	84,482	35,736	59,076	94,812	92,699	1,826	287	94,812	30.3	38	1,898	291	99	4,838	5,418
Ohio	-	4,980	46,209	104	-	51,293	-	-	16,116	35,073	104	29,415	12,595	42,010	41,446	554	10	42,010	2.4	3	34	4	8	170	22,606
Oklahoma	310	78,973	235,238	13,000	-	327,521	310	-	301,120	26,091	-	280,795	69,724	350,519	338,050	6,673	5,796	350,519	165.4	241	9,241	912	449	11,750	25,088
Oregon	-	-	102,740	5,706	-	108,446	-	-	102,740	5,706	-	87,464	24,025	111,489	110,459	946	84	111,489	7.5	12	1,097	50	48	3,096	13,153
Pennsylvania	17	13,598	178,832	11,881	5,073	209,401	17	5,073	193,511	1,329	9,471	116,118	14,967	131,085	127,489	3,328	268	131,085	20.4	-	-	-	188	5,223	42,467
Rhode Island	-	-	-	-	-	-	-	-	-	-	-	237	19	256	249	7	-	256	0.0	-	-	-	1	31	1,634
South Carolina	-	-	45,432	-	-	45,432	-	-	41,123	4,309	-	39,208	9,336	48,544	47,822	591	131	48,544	27.0	13	643	94	76	2,504	11,553
South Dakota	1,681	40,485	144,108	2,944	-	189,218	1,681	-	-	109,486	77,951	48,755	52,887	101,642	99,015	2,244	383	101,642	37.7	56	2,871	327	106	4,149	15,106
Tennessee	-	71,091	178,263	13,152	383	262,889	-	-	262,889	-	-	104,769	22,158	126,927	122,118	3,131	1,678	126,927	132.2	272	8,821	892	729	16,752	49,213
Texas	160	124,637	615,370	-	-	740,167	160	-	-	126,279	614,729	498,608	20,373	518,981	501,797	6,148	11,036	518,981	212.6	122	8,926	747	275	10,618	58,636
Utah	1,174	35,777	42,464	496	-	79,911	127	-	-	877	78,907	22,944	2,364	25,308	25,077	174	57	25,308	22.5	6	379	36	19	1,069	26,072
Vermont	-	-	-	-	-	-	-	-	-	-	-	-	405	405	398	6	1	405	24.7	-	-	-	1	45	251
Virginia	-	8,740	106,454	2,359	-	117,553	-	-	115,194	2,359	-	47,912	34,275	82,187	79,779	2,232	176	82,187	21.4	17	471	43	83	2,964	9,766
Washington	574	21,703	105,162	-	-	127,439	-	574	126,865	-	-	99,873	10,493	110,366	105,164	5,055	66	110,285	6.0	1	34	3	55	3,019	25,141
West Virginia	-	-	52,375	-	-	52,375	-	-	52,375	-	-	48,109	16,527	64,636	64,420	164	52	64,636	8.0	10	286	65	34	711	16,967
Wisconsin	2,124	21,283	104,897	33,235	66,906	228,445	2,124	-	104,897	-	121,424	32,475	7,660	40,135	39,107	995	36	40,138	9.0	2	131	10	63	1,908	74,880
Wyoming	1,513	-	44,137	486	-	46,136	1,513	-	-	20,495	24,128	5,968	34,235	40,203	39,206	970	27	40,203	6.7	5	404	6	7	469	808
Puerto Rico	259	-	-	-	-	259	259	-	-	-	-	49,332	-	49,332	47,984	1,210	138	49,332	28.0	8	538	10	57	2,322	-
Virgin Islands	-	-	-	-	-	-	-	-	-	-	-	427	-	427	425	2	-	427	0.0	-	-	-	-	-	53
TOTALS	37,439	1,220,567	4,186,444	174,982	72,931	5,692,363	17,473	20,621	1,910,006	1,789,058	1,955,203	3,719,783	967,768	4,687,551	4,516,388	97,281	44,041	4,687,710	93.9	4,825	231,743	23,566	9,089	273,393	986,411

ARS Form 1-68
JUNE 1966

SUMMARY OF BRUCELLOSIS ERADICATION ACTIVITIES IN COOPERATION WITH THE VARIOUS STATES UNDER THE MARKET CATTLE TESTING PROGRAM

CALENDAR YEAR 1967

STATE OR TERRITORY	BACK TAGGING											LABORATORY TESTS								TESTS OF HERDS OF ORIGIN OF REACTORS					COWS FROM OTHER STATES
	TAGS APPLIED AT					TOTAL ANIMALS TAGGED	TAGS APPLIED BY					COWS ORIGINATING IN THIS STATE								INFECTED			NEGATIVE		
	RANCH OR FARM	PUBLIC STOCK-YARDS	OTHER LIVESTOCK MARKETS	SLAUGHTER ESTABLISH-MENTS	OTHER		OWNER-OWNER REPRE-SENTA-TIVE	DEALER	MARKET EMPLOYEES	REGULATORY PERSONNEL	OTHER	TESTING LABS		TOTAL TESTS	RESULTS OF BLOOD TESTS					HERDS	ANIMALS	REACTORS	HERDS	ANIMALS	
												LABS IN THIS STATE	LABS IN OTHER STATES		NEGATIVE	SUSPECT	REACTOR	TOTAL	INFECTION RATE PER 10,000 ANIMALS						
Alabama	--	--	199,802	219	--	200,021	--	--	105,803	94,218	--	119,135	22,985	142,120	138,754	1,707	1,659	142,120	116.7	240	7,625	935	451	10,936	6,628
Alaska	--	--	--	--	--	--	--	--	--	--	--	245	2	247	247	--	--	247	00.0	--	--	--	--	--	--
Arizona	2,096	19,506	87,520	--	185	109,307	2,096	--	--	107,211	--	8,580	6,116	14,696	14,510	146	40	14,696	27.2	10	825	31	6	1,041	1,119
Arkansas	16	22,152	1,656	--	--	23,824	--	--	--	23,824	--	121,584	26,914	148,498	146,178	1,536	784	148,498	52.8	159	6,540	680	287	5,575	15,217
California	2,037	--	88,952	34,235	--	125,224	1,802	--	32,040	91,382	--	76,061	1,892	77,953	76,495	1,401	57	77,953	7.3	9	1,719	32	55	3,028	26,910
Colorado	932	35,297	76,796	6,150	700	119,875	932	--	83,027	35,916	--	33,828	14,194	48,022	47,629	315	78	48,022	16.2	16	1,672	101	48	3,529	7,347
Connecticut	--	--	--	--	--	--	--	--	--	--	--	--	33	33	33	--	--	33	00.0	--	--	--	--	--	--
Delaware	--	--	5,541	--	--	5,541	--	--	5,541	--	--	141	1,381	1,522	1,501	17	4	1,522	26.3	--	--	--	3	13	5,164
Florida	378	--	92,297	--	--	92,675	378	--	--	92,297	--	87,092	6,341	93,433	90,592	443	2,398	93,433	256.7	89	9,627	636	132	6,998	11,942
Georgia	--	1,343	86,976	1,964	347	90,630	--	--	1,343	86,976	2,311	171,085	7,276	178,361	176,389	1,138	834	178,361	46.8	162	6,068	916	175	6,205	20,340
Hawaii	--	--	--	--	--	--	--	--	--	--	--	14,178	--	14,178	13,838	327	13	14,178	9.2	1	36	5	1	257	--
Idaho	12	--	167,918	2,860	--	170,790	12	--	107,368	60,550	2,860	30,839	27,571	58,410	58,253	17	140	58,410	24.0	15	1,426	78	24	885	20,388
Illinois	--	93,722	84,520	4,717	--	182,959	--	9,573	41,715	131,671	--	97,665	51,388	149,053	143,945	4,183	925	149,053	62.1	124	4,161	723	370	8,910	44,139
Indiana	37	36,996	106,418	1,765	--	145,216	37	--	108,391	31,764	5,024	35,915	40,919	76,834	72,909	3,639	286	76,834	37.2	22	820	122	176	4,513	13,226
Iowa	976	7,508	177,333	16,777	45	202,639	--	--	--	2,582	200,057	174,658	24,752	199,410	196,029	2,449	932	199,410	46.7	57	1,930	202	362	9,460	44,265
Kansas	193	37,548	206,449	--	--	244,190	193	--	133,043	11,646	99,308	97,794	62,083	159,877	154,822	4,371	684	159,877	42.8	123	5,023	477	307	9,592	35,262
Kentucky	2	46,231	120,498	2,918	--	169,649	--	--	6,622	163,025	2	104,996	59,947	164,943	156,971	6,217	1,755	164,943	106.4	202	6,650	788	701	14,730	26,356
Louisiana	--	--	230,345	--	--	230,345	--	--	230,345	--	--	143,134	25,309	168,443	164,031	143	4,269	168,443	253.4	1,262	62,808	7,844	1,018	27,010	18,933
Maine	9,883	252	555	7,459	--	18,149	--	9,883	807	--	7,459	16,506	253	16,759	16,699	56	4	16,759	2.4	--	--	--	3	42	16
Maryland	775	18,560	23,667	310	265	43,577	--	775	34,419	7,808	575	12,201	23,806	36,007	35,251	728	28	36,007	7.8	--	--	--	11	599	18,251
Massachusetts	--	--	146	--	--	146	--	--	--	146	--	924	352	1,276	1,215	61	--	1,276	00.0	--	--	--	1	47	176
Michigan	952	16,234	100,783	278	--	118,247	4	948	100,509	552	16,234	88,095	2,528	90,623	81,690	8,566	367	90,623	7.8	4	78	18	201	5,809	28,162
Minnesota	--	195,960	19,586	--	--	215,546	--	--	485	1,387	213,674	108,774	10,986	119,760	118,989	675	96	119,760	8.0	2	66	3	33	821	84,404
Mississippi	--	--	64,164	838	--	65,002	--	--	1,046	63,956	--	172,343	24,265	196,608	192,665	41	3,902	196,608	198.5	881	31,608	5,539	784	19,353	39,000
Missouri	53	117,454	74,027	3,540	--	195,074	--	--	--	17	195,057	175,127	57,625	232,752	228,727	3,219	806	232,752	34.6	151	5,158	436	459	13,256	53,615
Montana	360	13,354	130,954	527	--	145,195	360	--	--	144,835	--	50,116	45,559	95,675	92,978	2,854	51	95,883	5.3	9	754	37	43	3,418	5,263
Nebraska	2,476	12,659	179,042	--	--	194,177	2,193	--	--	8,841	183,143	121,053	13,152	134,205	132,410	1,549	246	134,205	18.3	32	1,874	220	88	5,033	48,610
Nevada	3,012	--	11,975	106	520	15,613	1,147	--	7,804	3,245	3,417	1,895	8,102	9,997	9,987	6	4	9,997	4.0	1	163	1	2	148	912
New Hampshire	--	--	--	--	--	--	--	--	--	--	--	--	121	121	120	1	--	121	00.0	--	--	--	--	--	--
New Jersey	--	--	--	--	--	--	--	--	--	--	--	--	3,479	3,479	3,479	--	--	3,479	00.0	--	--	--	2	114	5,566
New Mexico	32	31,231	35,075	--	89	66,427	--	--	58,915	7,348	164	11,720	13,991	25,711	25,459	164	88	25,711	34.2	9	811	62	10	1,360	14,473
New York	58	719	3,529	654	--	4,960	58	--	4,596	--	306	3,109	62	3,171	3,078	89	4	3,171	12.6	--	--	--	10	746	10,376
North Carolina	6	--	82,257	8	28	82,299	--	28	19,817	62,446	8	73,322	13,677	86,999	86,157	726	116	86,999	13.3	12	435	58	73	3,970	12,766
North Dakota	20	57,372	130,842	--	1,141	189,375	14	--	6,417	75,728	107,216	16,619	61,654	108,273	105,588	2,381	304	108,273	28.1	25	1,202	113	104	4,883	8,203
Ohio	--	15,969	305,161	--	--	321,130	--	--	305,320	15,810	--	40,837	11,668	52,505	51,932	533	40	52,505	7.6	10	195	49	9	241	26,346
Oklahoma	501	79,309	692,138	--	--	771,948	501	--	572,535	27,396	171,516	247,567	58,189	305,756	299,318	1,371	5,067	305,756	165.7	439	17,450	2,036	696	19,454	24,899
Oregon	132	--	227,395	1,930	--	229,457	132	--	227,395	1,930	--	72,767	23,099	95,866	94,862	943	61	95,866	6.4	4	656	6	38	2,662	14,431
Pennsylvania	--	11,577	169,329	17,097	7,810	205,813	--	7,810	180,906	--	17,097	122,815	20,761	143,576	138,005	5,307	264	143,576	18.4	--	--	--	212	6,578	42,601
Rhode Island	--	--	--	--	--	--	--	--	--	--	--	27	2	29	28	1	--	29	00.0	--	--	--	--	--	374
South Carolina	--	--	40,301	18	--	40,319	--	--	36,212	4,089	18	35,228	11,634	46,862	46,407	393	62	46,862	13.2	2	63	2	38	1,393	8,344
South Dakota	1,153	43,792	153,147	8,283	--	206,375	1,153	--	35	104,626	100,561	46,260	51,728	97,988	95,010	2,625	353	97,988	36.1	49	2,704	343	92	3,460	19,958
Tennessee	--	63,145	173,560	10,995	387	248,087	--	--	248,087	--	--	100,093	16,419	116,512	112,709	2,702	1,101	116,512	94.5	181	7,707	926	373	9,490	54,579
Texas	285	108,782	673,536	--	--	782,603	285	--	--	140,715	641,603	482,214	26,623	508,837	495,180	466	13,191	508,837	259.2	113	5,228	516	349	11,442	57,719
Utah	1,279	29,839	39,962	897	--	71,977	44	--	2,021	4,237	65,675	22,717	2,548	25,265	25,133	97	35	25,265	13.9	4	604	51	13	581	20,639
Vermont	--	--	--	--	--	--	--	--	--	--	--	--	109	109	109	--	--	109	00.0	--	--	--	--	--	309
Virginia	--	9,145	92,546	2,630	--	104,321	--	--	101,691	2,630	--	41,431	39,592	81,023	78,964	1,937	122	81,023	15.1	16	450	71	59	1,667	10,267
Washington	491	15,450	92,764	--	--	108,705	--	491	108,214	--	--	85,660	11,066	96,726	94,198	2,441	46	96,685	4.8	2	461	7	37	2,489	18,884
West Virginia	--	--	38,530	--	--	38,530	--	--	38,530	--	--	44,191	9,234	53,425	53,259	126	40	53,425	7.5	5	171	30	31	737	14,153
Wisconsin	--	79,226	101,035	25,873	305,200	511,334	--	305,200	101,035	21,831	83,268	42,432	14,702	57,134	55,647	1,487	--	57,134	00.0	--	--	--	--	--	85,968
Wyoming	620	--	32,195	1,270	--	34,085	620	--	--	32,375	1,090	5,067	23,101	28,168	27,220	911	37	28,168	13.1	1	203	1	15	1,261	1,151
Puerto Rico	--	--	--	--	--	--	--	--	--	--	--	49,618	--	49,618	48,158	1,341	119	49,618	24.0	10	978	21	58	2,127	--
Virgin Islands	--	--	--	--	--	--	--	--	--	--	--	416	--	416	416	--	--	416	00.0	--	--	--	--	--	3
TOTALS	28,767	1,220,332	5,421,222	154,318	316,717	7,141,356	11,961	334,708	3,012,034	1,665,010	2,117,643	3,638,074	979,190	4,617,264	4,504,173	71,846	41,412	4,617,431	89.7	4,453	195,949	24,116	7,960	235,863	1,027,654

ANH FORM 1-48
JUNE 1966

BRUCELLOSIS TESTS OF GOATS AND SWINE, CALENDAR YEAR 1966

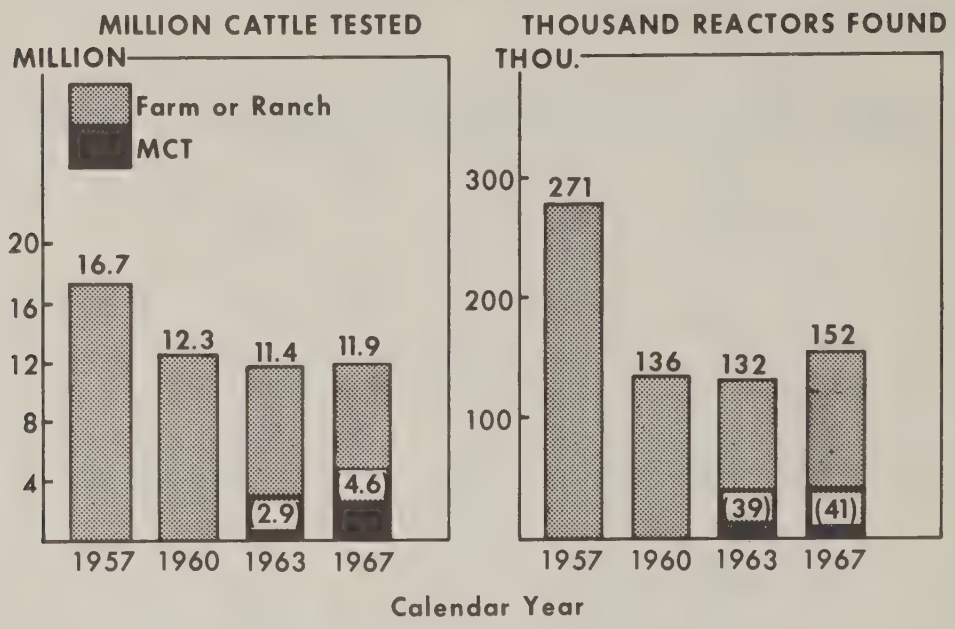
State or Territory	Goats					Swine			
	Tested		Infected			Tested		Infected	
	Lots	Animals	Lots	Animals	Suspects	Lots	Animals	Lots	Animals
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Alabama	--	--	--	--	--	424	3,777	47	145
Alaska	1	7	--	--	--	4	128	--	--
Arizona	104	519	1	2	13	38	1,101	--	--
Arkansas	7	71	--	--	--	149	859	25	68
California	239	1,170	1	1	9	1,321	19,902	25	568
Colorado	167	1,965	4	4	7	76	4,268	--	--
Connecticut	4	13	--	--	--	1	12	--	--
Delaware	3	18	--	--	--	5	54	--	--
Florida	31	196	--	--	--	325	3,105	54	122
Georgia	9	28	--	--	--	619	8,949	44	257
Hawaii	11	158	3	4	7	522	7,915	17	107
Idaho	17	37	2	2	1	81	521	7	9
Illinois	68	315	2	2	1	6,306	46,004	44	122
Indiana	58	308	--	--	3	2,945	34,249	32	43
Iowa	10	34	--	--	1	29,916	207,619	766	1,122
Kansas	29	74	1	1	3	294	3,625	57	119
Kentucky	11	66	--	--	--	639	4,703	209	492
Louisiana	4	8	--	--	--	262	2,323	33	141
Maine	13	100	--	--	--	340	3,292	27	403
Maryland	30	437	--	--	5	166	2,420	8	24
Massachusetts	51	294	--	--	4	116	2,401	9	128
Michigan	43	165	--	--	1	86	944	1	1
Minnesota	22	96	--	--	1	919	10,529	5	7
Mississippi	7	25	--	--	1	129	3,205	20	140
Missouri	46	206	--	--	1	1,736	17,491	75	568
Montana	6	34	--	--	1	93	954	1	2
Nebraska	9	35	--	--	--	609	7,460	10	10
Nevada	12	25	--	--	--	25	269	--	--
New Hampshire	24	96	--	--	--	--	--	--	--
New Jersey	146	516	--	--	--	26	841	--	--
New Mexico	27	122	--	--	4	18	95	1	3
New York	60	411	--	--	3	--	--	--	--
North Carolina	15	92	--	--	--	353	8,383	46	217
North Dakota	2	22	--	--	--	62	369	1	1
Ohio	82	572	--	--	8	1,065	8,217	4	20
Oklahoma	67	178	--	--	2	532	3,307	19	27
Oregon	86	590	--	--	10	32	435	--	--
Pennsylvania	158	1,141	--	--	1	217	2,133	3	68
Rhode Island	9	60	--	--	3	3	111	--	--
South Carolina	9	59	--	--	--	112	1,641	7	129
South Dakota	5	11	--	--	--	464	4,439	3	5
Tennessee	8	20	--	--	--	194	1,733	1	21
Texas	25	680	--	--	--	55	645	1	4
Utah	25	171	3	6	6	1,888	4,097	1	1
Vermont	2	15	--	--	--	146	1,404	2	7
Virginia	32	92	--	--	6	156	2,354	8	62
Washington	103	483	--	--	1	342	1,370	2	18
West Virginia	6	6	--	--	--	12	203	--	--
Wisconsin	27	981	--	--	--	1,273	9,357	6	12
Wyoming	6	13	--	--	--	26	220	4	20
Puerto Rico	34	243	--	--	--	6,974	32,018	112	686
Virgin Islands	17	102	--	--	--	87	306	--	--
Total	1,987	13,086	17	22	103	62,183	481,757	1,737	5,906
Percent infected			0.86	0.17	0.79			2.79	1.22

BRUCELLOSIS TESTS OF GOATS AND SWINE, CALENDAR YEAR 1967

State or Territory	Goats					Swine			
	Tested		Infected			Tested		Infected	
	Lots	Animals	Lots	Animals	Suspects	Lots	Animals	Lots	Animals
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Alabama	6	30	--	--	--	1,995	4,979	76	116
Alaska	3	7	--	--	--	4	132	--	--
Arizona	109	701	2	2	17	209	8,170	29	205
Arkansas	17	310	--	--	--	102	2,651	17	80
California	183	748	1	1	3	2,024	18,322	34	565
Colorado	165	343	4	4	3	105	5,078	1	2
Connecticut	7	63	--	--	--	18	165	6	39
Delaware	1	7	--	--	--	7	232	--	--
Florida	32	116	--	--	--	436	5,144	96	283
Georgia	12	262	--	--	--	575	7,917	32	225
Hawaii	6	41	--	--	2	768	7,125	76	240
Idaho	12	24	--	--	--	76	588	6	22
Illinois	52	231	1	1	1	7,627	58,588	64	251
Indiana	43	189	--	--	--	2,609	32,141	31	46
Iowa	26	125	--	--	--	27,596	205,886	578	780
Kansas	48	113	4	4	6	295	3,953	21	29
Kentucky	19	38	--	--	1	558	4,313	84	367
Louisiana	5	10	--	--	--	164	2,024	8	57
Maine	15	46	--	--	--	536	3,142	30	476
Maryland	37	345	--	--	1	176	2,057	3	3
Massachusetts	50	548	--	--	11	101	1,712	4	16
Michigan	29	104	--	--	2	86	761	1	1
Minnesota	9	31	--	--	2	745	7,757	6	8
Mississippi	12	41	--	--	--	136	2,219	15	98
Missouri	8	64	1	4	--	1,361	12,864	19	64
Montana	--	--	--	--	--	70	782	--	--
Nebraska	7	19	--	--	--	598	6,663	21	25
Nevada	12	36	--	--	--	54	785	1	5
New Hampshire	21	72	--	--	2	4	34	--	--
New Jersey	141	1,081	--	--	2	9	331	--	--
New Mexico	40	173	2	2	1	36	423	1	11
New York	63	399	--	--	4	1	6	1	6
North Carolina	15	252	--	--	2	364	7,156	27	110
North Dakota	--	--	--	--	--	63	607	3	5
Ohio	103	504	--	--	6	1,025	9,500	2	2
Oklahoma	47	248	--	--	--	562	3,742	9	67
Oregon	51	430	--	--	16	2,283	4,722	--	--
Pennsylvania	149	1,063	--	--	4	219	2,495	--	--
Rhode Island	18	73	--	--	--	10	282	1	1
South Carolina	11	66	--	--	--	214	3,077	4	32
South Dakota	1	2	--	--	--	562	5,313	11	23
Tennessee	11	102	--	--	--	241	3,003	4	88
Texas	15	337	--	--	--	48	896	2	5
Utah	10	33	--	--	--	3,645	8,572	--	--
Vermont	1	1	--	--	--	31	893	4	147
Virginia	23	103	--	--	--	182	3,515	13	80
Washington	27	95	--	--	--	94	378	--	--
West Virginia	4	5	--	--	--	1,824	5,703	--	--
Wisconsin	26	1,362	--	--	1	2,559	18,271	1	2
Wyoming	11	25	--	--	--	21	305	--	--
Puerto Rico	97	310	--	--	1	7,794	35,761	27	35
Virgin Islands	41	294	--	--	--	119	474	--	--
Total	1,851	11,622	15	18	88	70,941	521,609	1,369	4,617
Percent infected			0.81	0.15	0.76			1.93	0.89

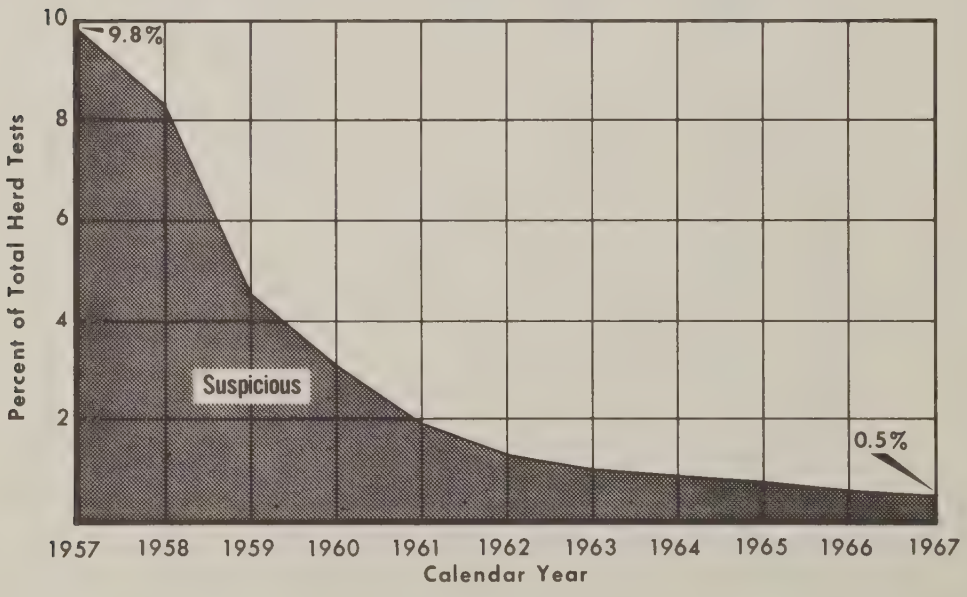
Brucellosis Eradication

BLOOD TESTING: CATTLE



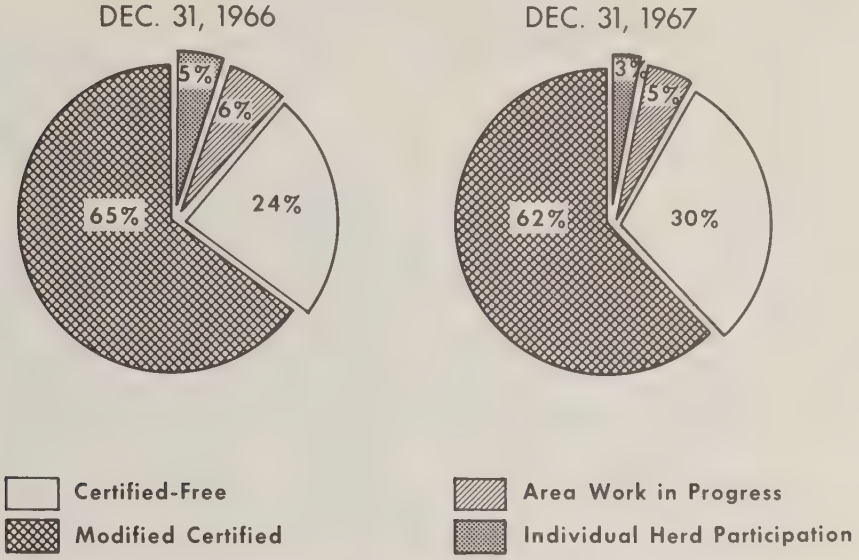
Brucellosis Eradication

MILK RING TESTING: HERD TESTS



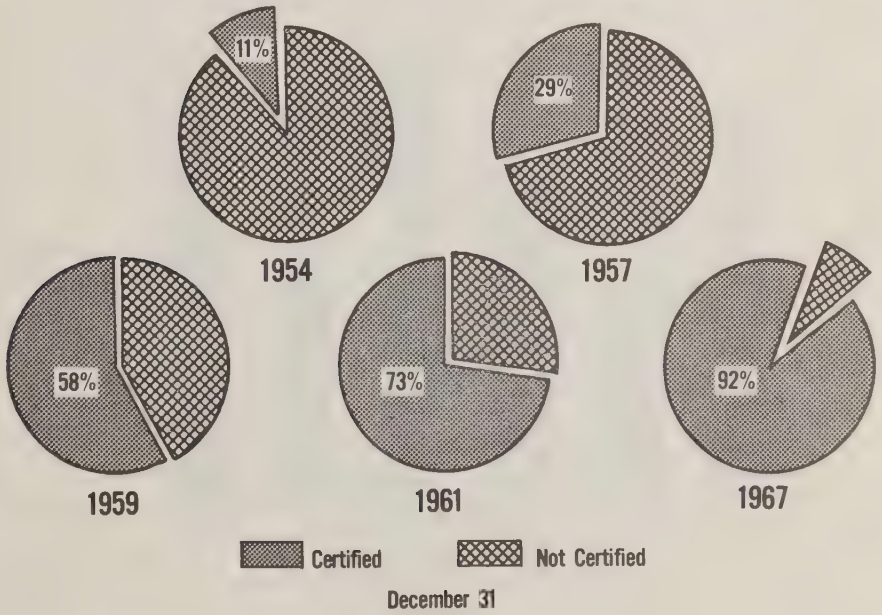
COUNTY CERTIFICATION STATUS

COOPERATIVE STATE-FEDERAL BRUCELLOSIS ERADICATION PROGRAM



COUNTY CERTIFICATION STATUS

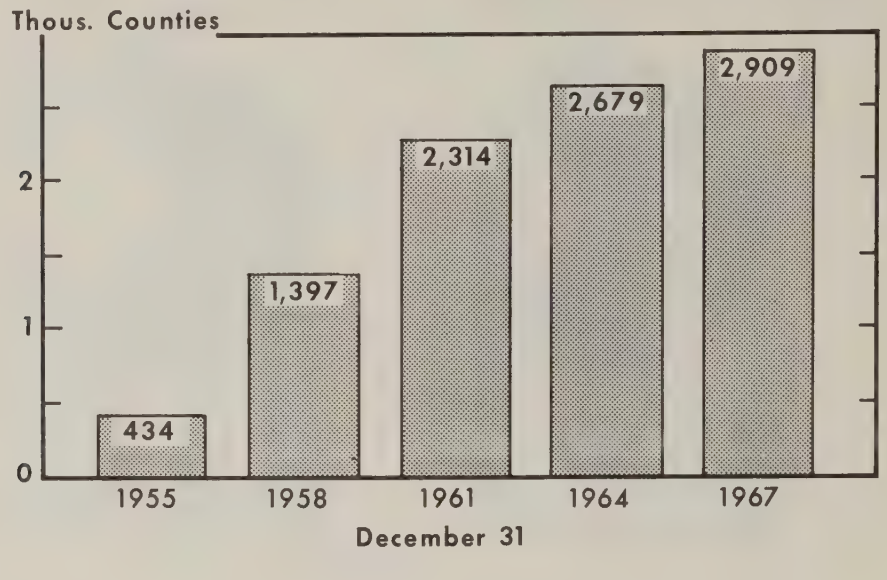
Cooperative State-Federal Brucellosis Eradication Program



311-534 O - 68 - 3

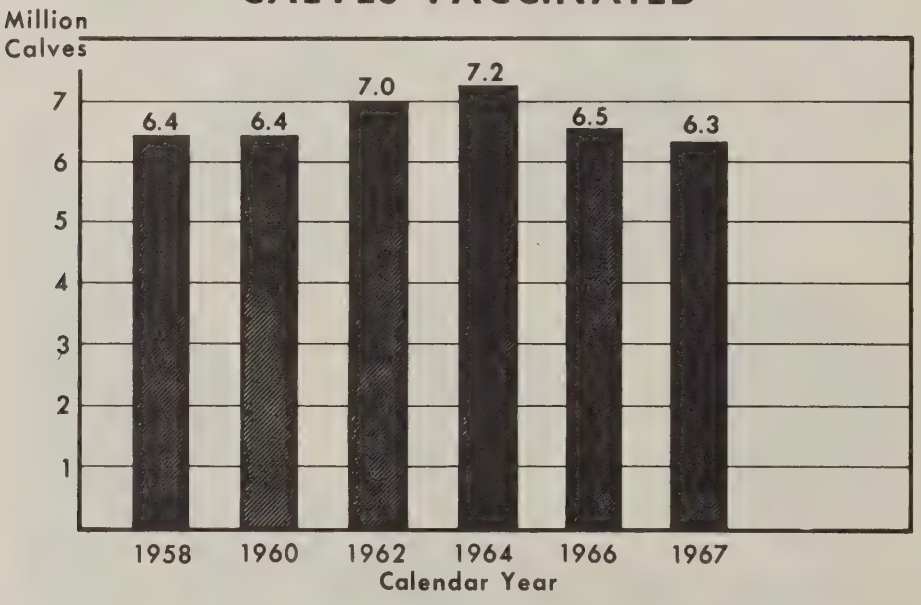
CERTIFIED COUNTIES

COOPERATIVE STATE-FEDERAL BRUCELLOSIS ERADICATION PROGRAM



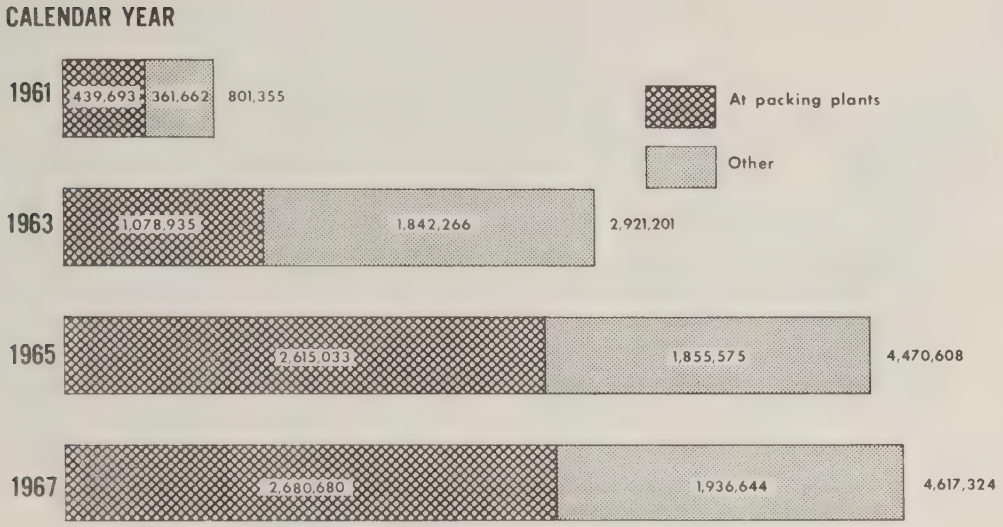
Brucellosis Eradication

CALVES VACCINATED

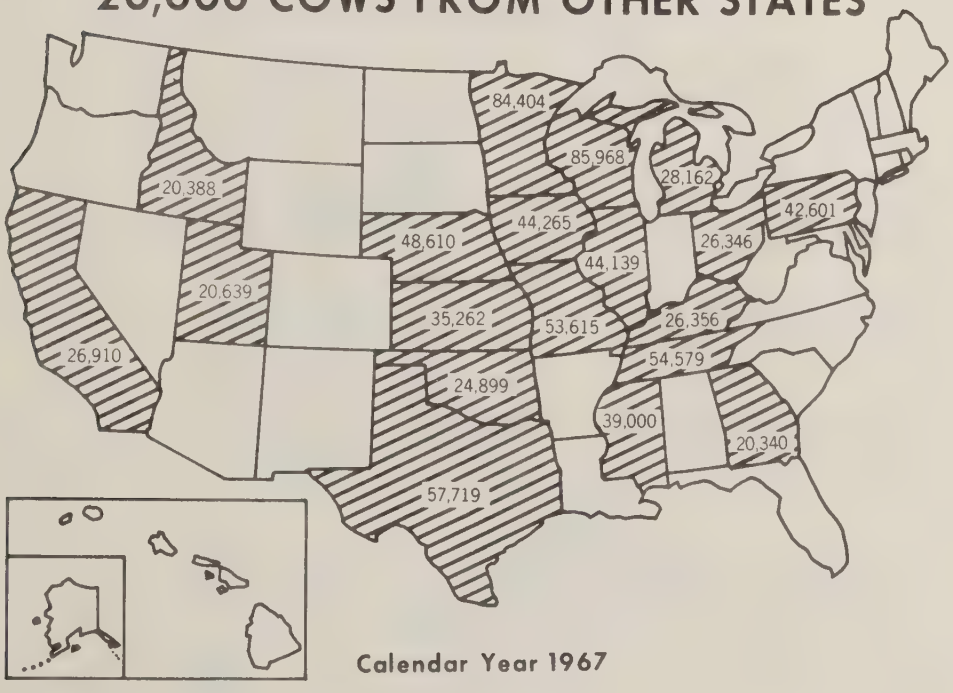


MARKET CATTLE TESTING PROGRAM

Cows Blood Tested



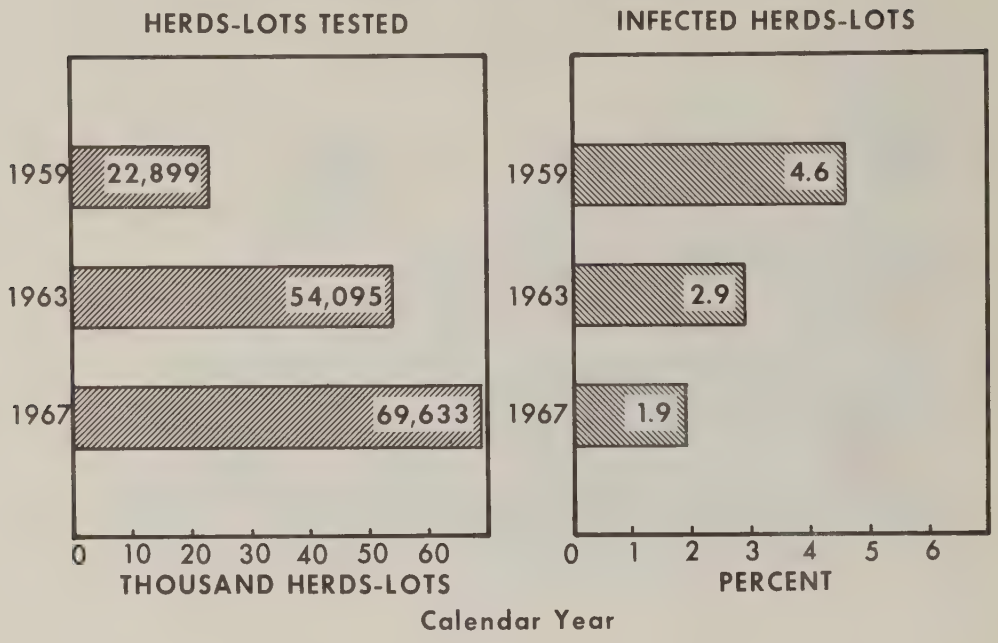
STATES TESTING MORE THAN 20,000 COWS FROM OTHER STATES



Calendar Year 1967

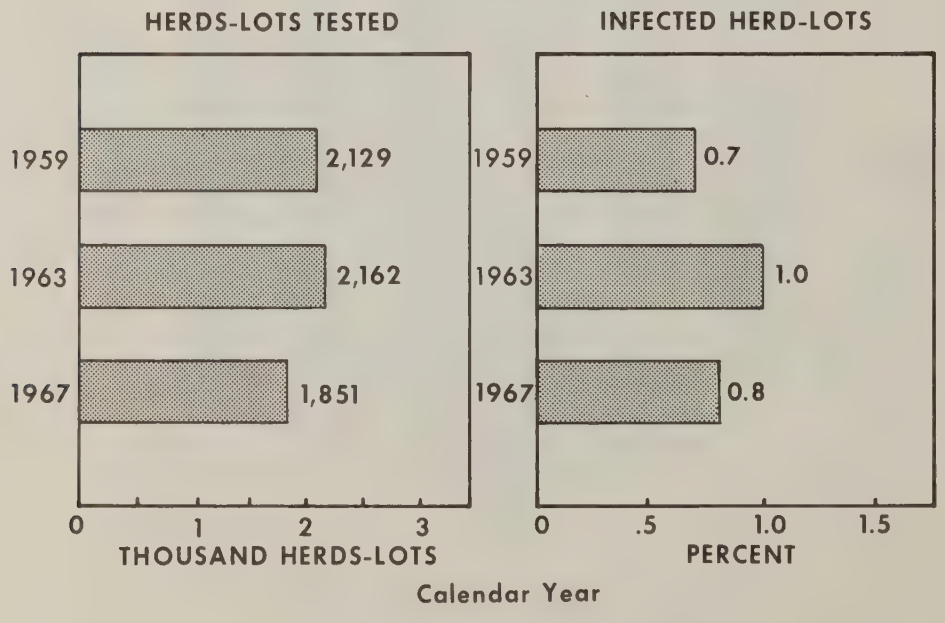
Brucellosis Eradication

BLOOD TESTING: SWINE



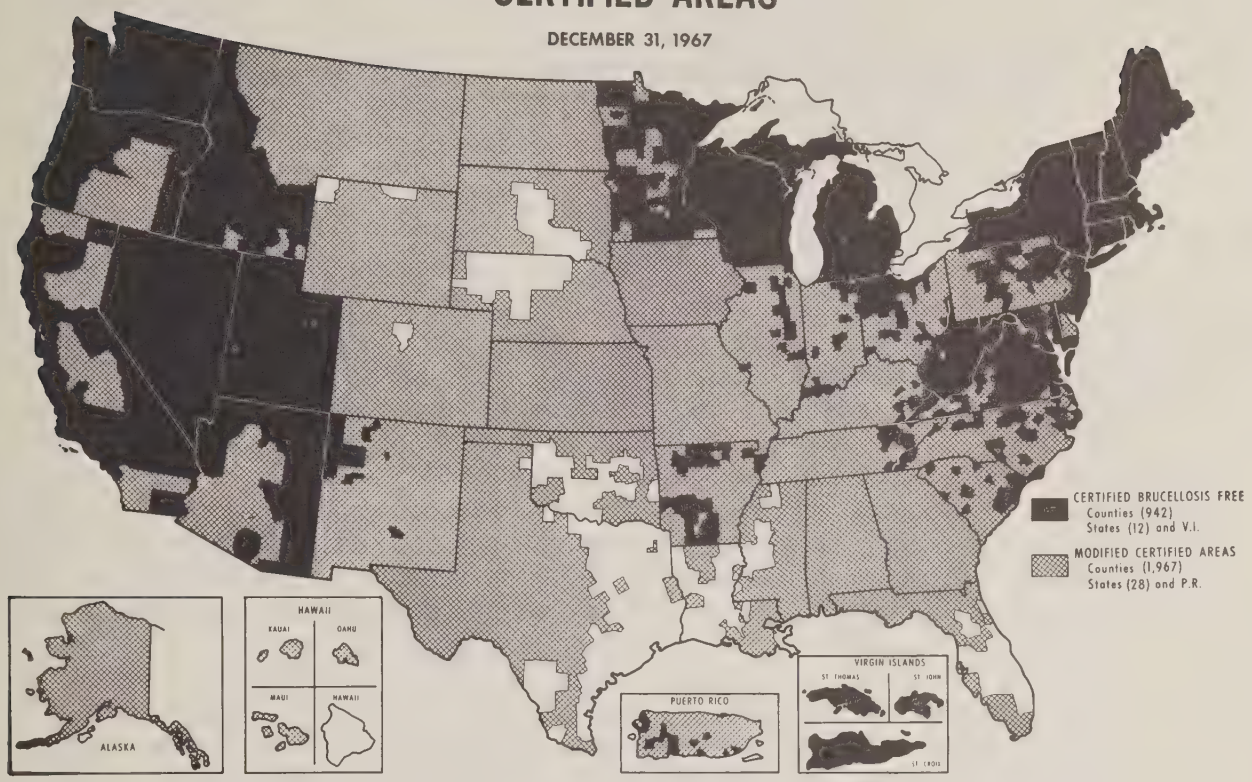
Brucellosis Eradication

BLOOD TESTING: GOATS



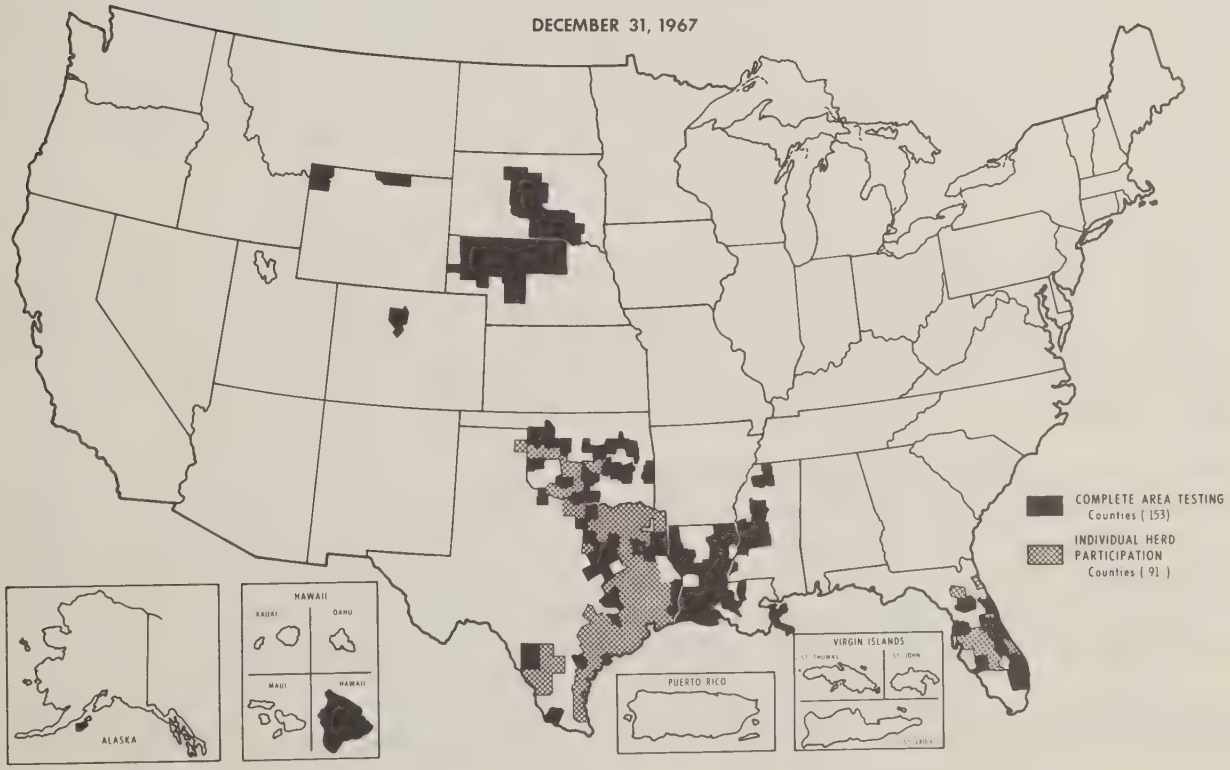
BRUCELLOSIS ERADICATION PROGRAM
CERTIFIED AREAS

DECEMBER 31, 1967



BRUCELLOSIS ERADICATION PROGRAM
NONCERTIFIED AREAS

DECEMBER 31, 1967



HOW OKLAHOMA USES THE REVISED TWO-COLOR BACKTAG

by
John J. Woolsey[1]

We believe the use of the recently revised national backtag as a salestag has the potential for vastly improving and speeding up total eradication of both tuberculosis and brucellosis as well as other diseases. We also believe that this procedure can provide the potential for directly tracing the origin and possible spread of any exotic diseases that might be introduced into this country.

As you know, the two-colored backtag, with identification numbers and letters printed on both sides, was designed for multiple uses. Disease eradication officials recommend that the tag be applied white side up on beef animals and yellow side up on all dairy animals routinely screened by the Milk Ring Test for the presence of brucellosis. A white tag signals the need for the meat inspector to collect a blood sample for the brucellosis test.

In Oklahoma, we apply the white side up on all breeding cattle regardless of type or class and the yellow side up on all other animals for three reasons: (1) We have relatively few dairy animals. (2) There are too many mixed breeds and dual purpose cattle which are never checked by the Milk Ring Test. (3) Varying the colors on breeding animals would slow down tagging in the sale barns.

Two different tagging procedures are used, depending on the sale barn. The tags are used as sale barn tags as well as backtags in about 70 percent of our auction markets. In 20 percent of the markets the tags are placed on slaughter animals only by outside tagging contractors, sale barn employee contractors, or our own people. As of February 1968, only 10 percent of our markets were not using either procedure. All of these furnish us with names and addresses of cattle tested at their markets. We expect most of these, plus most of the "contractor tagged" barns, to be using the backtag as a salestag in the near future.

Since Oklahoma requires that cattle be tested at the market, we use the salestag numbers to identify the blood sample, just as it would be used if the sample were taken at slaughter. When a cow bearing a white tag is bled at the market, the tag is spray-painted yellow. This prevents the retesting of the animal if she should go to slaughter. About 20 percent of the animals tested at the market, to permit their return to the farm, go to slaughter instead. Painting the tags saves us about $1,500 to $2,000 per month and still identifies the animal.

Oklahoma has about 91 active auction markets, including two public stockyards. There are three public stockyards in the State but one has no auction. However, it does backtag cattle using an outside contractor. The markets vary from antique to modern and the attitudes of the owners vary likewise. The markets range from calf or feeder sales to slaughter-cow markets and from the very small to those made up of several commission companies. Nearly all of them use salestags to keep track of cattle and nearly all of them sell animals one at a time.

---

[1] Assistant Veterinarian in Charge, Animal Health Division, ARS, USDA, Oklahoma City, Okla.

All these markets are required to have a veterinarian in attendance and are supervised and checked by 8 State livestock inspectors. These markets handle about 3,000,000 cattle yearly. All breeding animals over 12 months of age going through a market are tested for brucellosis unless they are going direct to slaughter, to a recognized quarantined feedlot, or to a public stockyard outside the State. Those destined for a public stockyard within the State are tested before they leave the auction market. We have classed our markets as either backtag-salestag (BTST) or contract backtag (CBT) markets. The BTST markets are those which use the colored backtag as a salestag, and all other markets are categorized as contract backtag markets.

There are over 4,000,000 cattle in Oklahoma, mostly beef. Half of the animals are under 2 years of age. They are moved around a lot and change hands frequently. About 1,200,000 are slaughtered each year, 57 percent of which are slaughtered outside of the State.

Of the herds in the counties striving for brucellosis modified-certified status, 25 to 50 percent are now qualified by use of backtag blood samples from market cattle and are not required to premise test. All of the certified counties are recertified with these samples and yearly reaccreditation of the State for tuberculosis is accomplished by backtagged slaughter cattle--no routine testing is done for TB. The only TB testing done in Oklahoma is traceback testing from infected herds and herds of origin of cattle with lesions at slaughter. The practitioners test a few animals for sales and shows, and some dairy herds are still tested in those counties that have a milk ordinance requiring it.

Getting the auction markets to use the backtag as a salestag was easier than we had anticipated. We started by calling in all auction market supervisors, obtaining their views and opinions, and attaching plenty of weight to their ideas. We then worked out practical methods for record-keeping at the markets and for both the State and Federal offices. These methods were agreed upon by the State and Federal officials in charge and then were explained to everyone concerned. They were further modified as suggested by the people doing the work.

The State auction market supervisors became sold on the idea and were quite enthusiastic. They were convinced that the BTST system would work to the benefit of all concerned. These men proved to the market operators that the plan would work and that quality supplies, easily adaptable to the existing market operation, were available in quantity and would continue to be available. The auction market operators were shown that the use of the BTST system would be advantageous and profitable for both them and the livestock industry.

The auction market yard foreman and the cattle taggers were shown how to tag and told why the animals must be tagged in the prescribed manner. The State livestock inspectors made repeated visits every sale day to help and advise them until the new tagging program became an established routine. Very little attempt was made to work up the producer's interest. Most of our producers already knew that the more backtagged results credited to them, the less premise testing they would have to do. The whole project snowballed. It became clear to everyone that the backtag-salestag would be successful.

The handling of the backtag-salestag program is strictly a cooperative undertaking between the State and Federal offices. Functions, costs, and responsibilities are divided. Plans and procedures agreed to are adhered to by both parties but changes and improvements are mutually agreed upon and inaugurated as we go along.

In specifying the backtag code letters for the markets, the State office follows the State code used by automobile license plates. It is responsible for properly conducting all phases of the backtag-salestag program in the field and making certain that copies of all drive-in tickets bearing names and addresses get to the State office to be filed for future use. It keeps the drive-in

tickets for 1 year, obtaining names and addresses from them to match the blood sample-backtag numbers listed on test sheets received from both auction markets and slaughtering establishments. The test sheets are then returned to the Federal office. A running inventory record of the number of backtag-salestags used is kept by the State. It notifies the Federal office of the balance on hand at the markets at the end of each month.

The Federal office supervises the overall administration of the program in general. It furnishes a year's supply of tags, as well as plenty of glue in any type of container wanted, to any market handling breeding cattle. The market must agree to tag properly and to furnish the State office with a copy of the producer's drive-in receipt bearing the BTST number and the owner's name address. The Federal office buys any salebarn tags and all glue on hand when a market starts on the BTST program. The old sale-barn tags are used by our field veterinarians in conducting routine premise testing and the glue is left at the market and used there. Further, the Federal office furnishes clerical help for most of the necessary accounting, including the credit of results obtained to the owners and counties involved.

Few problems were encountered and not too many objections were heard concerning the program.

The objections noted were mostly the result of a natural reluctance to change a successful method of operating. Some markets did not have enough copies of the drive-in tickets for us, and some were reluctant to tag on the shoulder instead of the hip as they had done for years. Some of them wanted tags with only three large numbers. We refused to furnish these because of the difficulty in reading the first small number (fourth from right) from a distance.

Some markets had been indicating the age of cattle with tag placement and could no longer do so with the new system. Some wanted duplicate tags, one for each side of the animal. We are now furnishing this type when absolutely necessary to get a market on the program.

Possibly the biggest problem we had was the careless attitude of the taggers in some of the markets. A few of the markets have no special man assigned to the job but just pick up any itinerant who is hanging around. Each new tagger has to be trained until all of them are in the habit of placing tags on the shoulder instead of the hip.

We have found many advantages and few disadvantages in using the backtag as a salestag. Advantages to the sale-barn owners include free tags and glue and cutting down or eliminating paperwork. They can provide an extra service to the customer for no extra charge. The backtag-salestag builds easily into their system of operation. It is a good tag, easy to see and will not curl. The tag saves manpower and paperwork by replacing the two or three tags per animal that were previously used. An additional advantage to market operators is the elimination of "outsiders" putting an extra tag on cattle in the market on sale day.

Disadvantages to the market operator are that he must tag on the shoulder and he must furnish us with an extra copy of the drive-in ticket. In addition, those commission companys who were using a color coding scheme to separate their livestock can no longer do so, nor can they "age" cattle by the placement of the tag.

There are no disadvantages for the producer as far as we can determine. Obviously, the important advantage for him is that it eliminates testing on the farm with its attendant expenditure of time, effort, and money. (Expense to the owner has been estimated here as about $1 per head when cattle are tested on the premise.)

Advantages of the BTST program for the regulatory officials are numerous. It has allowed us to record the screening of two to four times as many cattle going to slaughter now, and the potential

is at least twice this. It increases the "usable" names and addresses on cattle backtagged, since the name and addresses must be correct on a producer's receipt. The use of the drive-in ticket instead of the ANH 4-52 (form for listing backtags applied) cut cattle listed as tagged for "traders" from 7 percent to less than 3 percent and it cut "unusable" (incomplete or erroneous) names and addresses for a high of 25 percent of the animals tagged down to less than 1 percent.

In addition, the program is already providing enough tagged cattle at slaughter to enable the State to establish free status for tuberculosis as well as brucellosis when the infection rate of both diseases drops low enough. It allows us to pinpoint and trace back, visibly diseased animals. We are sure that it will produce more ANH 6-35 traceback forms reporting TB found on kill because the meat inspector knows we can trace back on an animal identified with a backtag. It has enabled the State to study the flow of cattle and to help spot illegal cattle movements. It has saved money and manpower for both State and Federal officials by freeing field test personnel. This has, in turn, freed connected clerical time that can be either eliminated or put to better use. It has cut down backtagging supervision time in the field and eliminated the associated paperwork in the office.

The advantages to the taxpayer are most significant: (All costs quoted below are based on a 45 percent return of blood samples from tagged slaughter cattle and are exclusive of the meat inspection charge for collecting as well as the laboratory and clerical costs involved.)

	CBT only July-Dec. 1966	Combined System July-Dec. 1967	BTST System only July-Dec. 1967
Cost of applying tags, cents	14	4.3	1.6
Cost of supervision, cents	8	1.1	.00087
Cost of blood samples returned, cents	43	25	11
Percent unusable (insufficient information)	10-25	3	0.75

As will be noted above under the new system, it costs about 1/10 as much to get a backtag applied, 1/900 as much to supervise the application of it and the blood samples returned cost about 1/4 as much as under the old system in effect in 1966. Oklahoma tagged almost 700,000 animals during the period from July to December 1967, using the two programs mentioned in the beginning. Five hundred eighty thousand animals were tagged by the backtag-salestag markets and a little over 100,000 were tagged by contractors, and others in the other markets.

Of the animals tagged via the BTST program, approximately 80 percent were either feeders, heifers, calves, or miscellaneous animals (horses, swine, etc.). It is assumed that the 100,000 plus animals tagged by the contractors and our people were all breeding cattle, eligible for slaughter. The total tagging operations supplied us with approximately 180,000 blood samples from both auction markets and slaughter to use as credit to the brucellosis program. About 80,000 of these results can also be used for TB reaccreditation. This many cattle were known to have been bearing either white tags which were returned to us with a blood sample or yellow spray-painted tags which were also returned to us, without a blood sample, for accredited slaughter establishments. Most important of all, the program provides a tested and proven procedure that will, if universally adopted, enable us to spot and stamp out any cattle disease that the industry wishes to eliminate and that we have the knowledge and tools to eradicate.

311-534 O - 68 - 4

Before switching to the Backtag-Salestag program, Oklahoma's livestock markets were applying three tags to market cows--the conventional saletag, a Bang's Negative tag, and the backtag. Now, the revised backtag serves all three purposes.

To maintain the identity of the carcass throughout the slaughtering procedure, before the hide is removed, the tag is pulled off, placed in a plastic bag, and attached to the carcass.

A meat inspector collects a sample of blood from the heart chambers and places the vial in the plastic bag attached to the carcass. This bag already contained the backtag.

If the meat inspector observes lesions indicating that the animal may have TB, a U.S. RETAINED tag is attached to the carcass. If lesions are extensive, the carcass is stamped "CONDEMNED." Traceback procedures begin by recording the backtag number and all other information that would help animal health officials to trace the cow back to the farm or ranch of origin.

A PILOT PROJECT: IDENTIFICATION AND TESTING OF MARKET SWINE FOR BRUCELLOSIS

by
E. A. Schilf[1]

In November 1967, a pilot project designed to establish procedures for a national market swine brucellosis testing program was launched in Iowa. During 1968, an estimated 4,500 farmers marketing their hogs through Farmbest, Inc., buying-slaughtering facilities will have their herds screened for the presence of brucellosis. This involves an area extending to Oakland, Nebr., on the west; Titonka, Minn., on the north; Holland, Iowa, on the east; and Altoona, Iowa, on the south.

All the procedures involved in this pilot project have been previously field tested. The pilot project was designed to determine if they were practical when applied to a fast-moving, modern, commercial hog buying-killing operation. The market swine testing methods were designed by my staff in concurrence with Iowa's Department of Agriculture.

During the first week of operation at the Denison, Iowa, slaughtering plant, 390 blood samples representing 66 herds were collected, identified, and shipped to the National Animal Disease Laboratory at Ames, Iowa, for testing. There are no plans at present to involve Farmbest's other slaughtering plant at Iowa Falls in the pilot project.

Test results during the first 15 weeks have disclosed only four positive lots out of approximately 15,000 lots and 7,600 swine tested. Two herds of origin have been tested and both were badly infected. Clinical manifestations of brucellosis were present in both herds, including reports of numerous abortions.

The manpower needs breakdown this way: The buyer at the hog buying station applies the tattoo to sows and boars and records the tattoo number on the purchasing documents. Two Federal livestock inspectors, each working six half days a week at the Denison plant, collect, identify, and ship the blood samples to the laboratory. A veterinarian will make farm tracebacks and bleed the herd of origin of animals found positive to the test for brucellosis at the time of slaughter.

With the incidence of swine brucellosis at such a low level in most areas of the United States, I firmly believe that a national market swine testing program is the only feasible way to eradicate the disease. For example, a December 1966 survey showed a nationwide infection rate of 0.42 percent in sows and boars. The cost of a down-the-road testing program would certainly be prohibited. The identification and blood sampling of breeding swine during the normal marketing and slaughtering process appears to be the only practical way of locating the few remaining infected herds.

As a source of human brucellosis or undulant fever, swine brucellosis is now the major threat. According to the Public Health Service, swine was the most probable source of infection for

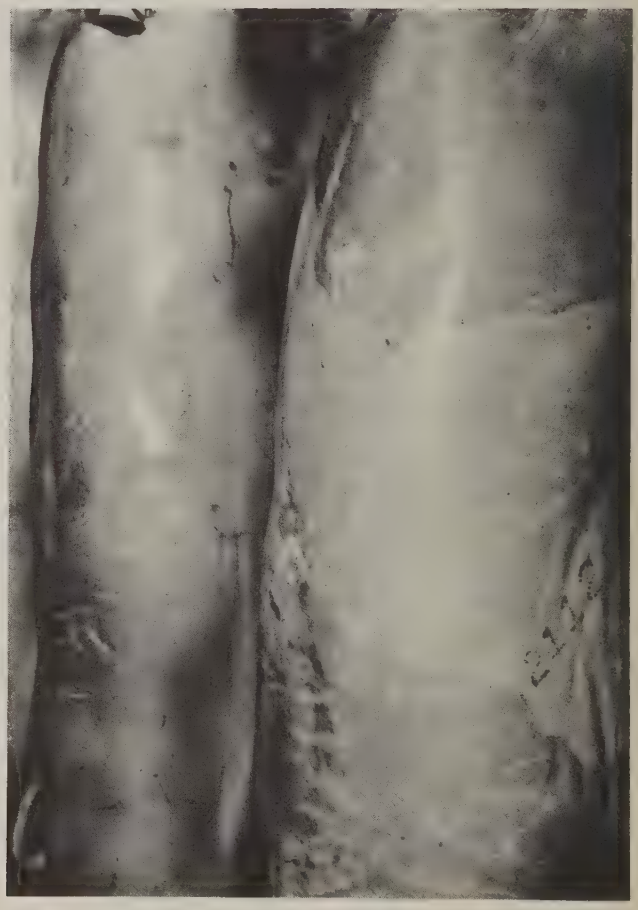
[1]Senior Staff Veterinarian, Cattle Diseases, Animal Health Division, ARS, USDA, Hyattsville, Maryland.

two-thirds of the human brucellosis cases reported during 1966. The only source of human infection is direct or indirect contact with livestock affected with the disease.

One of the major benefits of eradicating swine brucellosis will be the regaining of a multimillion dollar export market for our pork. Before October 31, 1966, some $10 million dollars worth of pork products--mostly pork livers and kidneys--were shipped to West Germany. On that date, West German health regulations went into effect that virtually eliminated this market. These regulations required that imported pork products be from swine free of both hog cholera and swine brucellosis and originate in areas where hog cholera has not been reported.

Cooperation between industry and government initiated a 5-point program that started our pork flowing to West Germany on a temporary approval basis. However, only the eradication of swine brucellosis and hog cholera will insure the maintenance of this export market.

This is where Iowa's Market Swine Testing pilot program for eradicating brucellosis begins. All sows and boars received at the pilot project's hog buying stations have a tattoo applied just below the backline and behind the shoulder. A hog buyer, from Carroll, Iowa, applies the tattoo.



During slaughter, hogs move through scalding vat and dehairing procedure. This reveals the tattoo applied at the buying station. To assure the most legible and permanent tattoo, a USDA-approved carbon ink for tattooing swine is used.

All sows and boars consigned to the buying station by one hog producer are tattooed with the same number. In acknowledging receipt and making payment for the hogs, the hog buyer associates this tattoo number with the owner's name and address. This record keeping establishes the herd of origin, should the blood test reveal the presence of brucellosis in the herd.

To collect a blood sample, blood clots are squeezed from the heart chambers into a small plastic container that has a tight-fitting lid. The samples are then refrigerated until they are transported by bus to the National Animal Disease Laboratory at Ames, Iowa, for testing.

A buyer (right) from Rotterdam, Netherlands, inspects livers as he negotiates for fresh pork and variety meats. This is one of the major objectives of the pilot program -- the regaining of multi-million dollar export market for our pork.

When blood tests indicate that infection is present, a veterinarian will make the farm traceback and bleed the herd of origin to determine if other animals are affected. Here a veterinarian uses a micro-blood collector to obtain a few drops of blood from a sow's ear for the brucellosis card test.

HOW SOUTH CAROLINA IS VALIDATING ALL REGISTERED SWINE HERDS

by
Carl Boyd[1]

South Carolina is taking the first major step to stamp out swine brucellosis.

The program is directed at 87 registered swine breeders who sell sizable numbers of gilts and boars as replacement stock. The State's goal is to have all these herds tested twice by July 1, 1968. Those that test clean will achieve a Validated Brucellosis-Free status.

In March, State-Federal animal health authorities discussed the feasibility of a program that would qualify all registered swine herds in the State as "brucellosis-free" with the South Carolina Swine Producers' Association. This organization, having a longtime interest in all diseases, felt the attack on swine brucellosis was a reasonable and practical approach. The consensus was that it was the responsibility of every swine producer to provide the healthiest replacement stock possible.

After conferring with animal health authorities in charge of State-Federal livestock disease eradication programs, the Association set the July "68" target date.

To maintain their Validated Brucellosis-Free status, the registered swine breeder must buy replacement stock from validated herds, from validated areas, or conduct adequate testing to assure that purchased animals are free of the disease. Also, the herd must be blood-tested annually and found free of the disease. The State furnishes the testing necessary to qualify the herd initially. The revalidation test is at the owner's expense.

When the South Carolina Swine Producers' Association accepted the sponsorship of the program, it immediately mailed to all its members a letter explaining the program. An application form was enclosed requesting information--name, address, and number of swine over 6 months of age.

When the program was initiated, three registered herds were validated. As of February 1968, a total of 43 herds have qualified as Validated Brucellosis-Free herds. Another eight herds have received the first blood test. Of these, all were negative except one herd that has been depopulated.

Apparently, the incidence of brucellosis in our registered swine herds is very low. This is most significant considering that 80 to 90 percent of all replacement swine in the State are produced by South Carolina registered swine producers.

Our deadline for eradicating brucellosis from cattle in South Carolina is 1970. And, since swine may transmit the disease to cattle, we should have the swine brucellosis situation under control by then. For this reason, we hope to concentrate our efforts on eradicating brucellosis from commercial swine herds after July 1968. We are already formulating our thoughts on this problem.

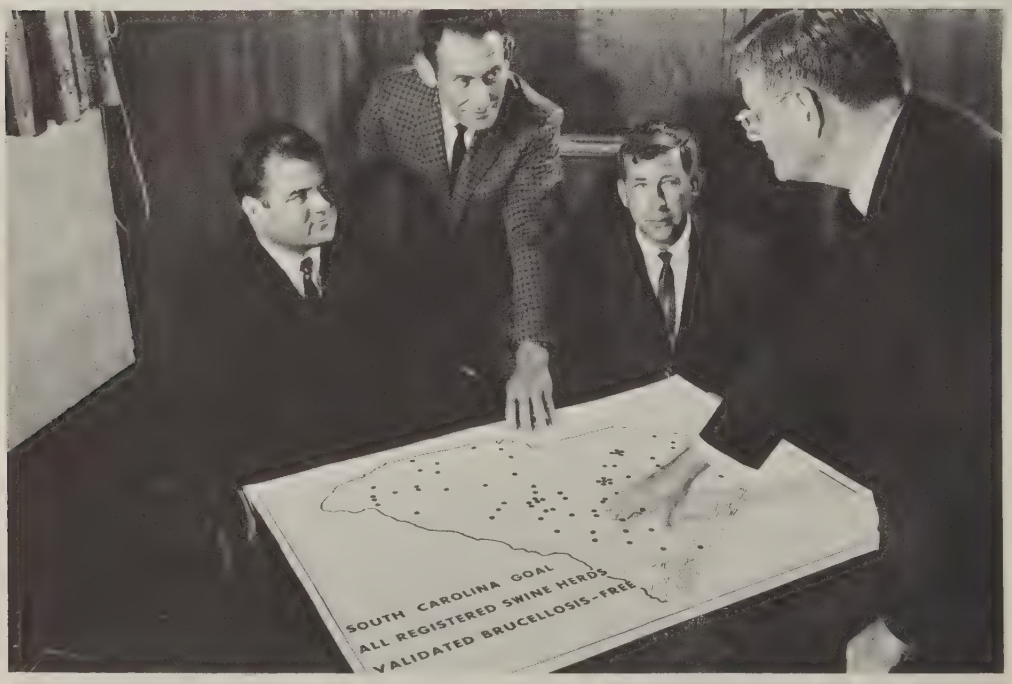
---

[1]Director, State-Federal Livestock Disease Eradication Program, Columbia, S.C.

The objective of the S.C. program is to display this Validated Brucellosis-Free herd sign at every registered swine herd premise. Here Carl Boyd, Director, State-Federal Livestock Disease Eradication Program, observes Fred B. Mathias, display his "validated" sign at the entrance of a farm near Lexington.

South Carolina is using the brucellosis card test for determining whether or not the disease is present in a herd. A district veterinarian, Bamberg, S.C., uses a microblood collector to obtain a blood sample from a vein in the sow's ear.

"All tests are negative" is a statement that all swine producers are glad to hear. An area veterinarian of Columbia, S.C., explains the reading of the "negative" blood test to a swine breeder. The card test, requiring only a few drops of blood, is conducted at the farm within a few minutes.



Each of the 87 dots marks the location of a registered swine herd. In all, eight breed associations are represented -- Duroc, Hampshire, Poland China, Berkshire, National Spotted Swine, Yorkshire, Chester White, and Tamworth.

THE ANIMAL IDENTIFICATION REGULATION

by
F. W. Hansen, Jr.[1]

Background

The importance of animal identification in the control and eradication of livestock diseases is becoming more apparent and more important as we become more dependent upon screening procedures in the conduction of a cooperative program. The ability to rapidly trace disease found at stockyards and in slaughtering establishments to the premises from which they originated is the critical need to successfully eliminate foci of infection.

A number of States have recognized this need on an intrastate basis. Examples of actions taken by States are Wisconsin and Iowa, each of which has promulgated regulations requiring the back-tagging of cattle moving to slaughter.

In 1966 the U.S. Livestock Sanitary Association (USLSA) endorsed a recommendation of the stockyards, markets, and transportation committee of that organization which suggested that intrastate identification requirements be furthered in States not now regulating that area. It also recommended that the ANH Division promulgate an interstate identification regulation applicable to slaughter cows over 2 years of age requiring slaughtered cows be identified by a backtag or by a brand that is recognized for official brand inspection purposes. The committee felt further that any such regulation should have wide review with industry, State officials, and other interested groups before promulgation.

At the 1967 meeting of the USLSA, the Brucellosis Committee also urged a regulation requiring the identification of bovine animals over 2 years of age. Early in 1967 the Division circulated through its several State offices a suggested proposal for a regulation of this nature.

Acting on the comments received, a regulation has been drafted and is now in the hands of our Office of the General Counsel to be reviewed for legal sufficiency before publication in the Federal Register as a notice of proposed rule making.

The Regulation

As the regulation is proposed, it will state that cattle 2 years of age and over, except steers and spayed heifers, which are being moved interstate for slaughter or to a concentration point which handles slaughter cattle, must be identified by a Department-approved backtag and accompanied by an Official Brand Inspection Certificate or a shipper's statement or a waybill or similar document stating: (1) The premises or origin of the animal; (2) the destination of the animal; (3) the number of animals covered by the waybill, certificate, or similar document; (4) the number or numbers of the backtags applied; (5) the name and address of the owner or shipper;

---

[1]Senior Staff Veterinarian, Disease Control Services, Animal Health Division, Agricultural Research Service, U.S. Department of Agriculture, Hyattsville, Md.

such certificate, statement, waybill, or similar document shall be surrendered to the management of the concentration point at time of delivery and shall be filed with the records of the transaction in accordance with requirements of the Packers and Stockyards Act for future reference; except that such cattle may be moved interstate from a premises of origin direct to the first concentration point of the shipper's choice where such identification as required by the regulation shall be applied and backtag numbers shall be furnished for recording on the consignment slip, dock ticket, billing record or similar form at the concentration point.

The person or persons who move the cattle interstate are responsible for identification of the animals in accordance with this section and for compliance with the other requirements.

Notwithstanding the provisions of the above paragraph, cattle 2 years of age and over accompanied by an Official Brand Inspection Certificate may move interstate from a premises of origin directly to a slaughtering establishment without complying with the tagging requirements contained in this regulation.

Effect of the Regulation

This amendment will: (1) Require that cattle over 2 years of age, except steers and spayed heifers, being moved interstate for slaughter purposes be identified by a Department-approved backtag; (2) provide for the application of such backtags at the first concentration point; and (3) exempt officially branded cattle moving interstate to slaughter from the backtagging requirements when accompanied by an Official Brand Inspection Certificate.

The most immediate benefits of this proposal will accrue to the brucellosis and tuberculosis program. We would also anticipate that this amendment will provide essential information upon which to conduct epidemiology or investigations of other disease conditions as the need arises. This capability is most essential to adequately cope with and eradicate a foreign disease.

Summary

Recognizing the need for strengthening our identification systems to adequately copy with eradication of livestock diseases, and in accordance with the recommendations of the U.S. Livestock Sanitary Association, and as a companion action being taken by several States, the Animal Health Division proposes to publish, as a notice of proposed rule making, an amendment to Title 9, Part 71, Code of Federal Regulations, the requirement that cattle over 2 years of age, except steers and spayed heifers, moving interstate for slaughter purposes be identified by a Department-approved backtag.

Approximately 40 percent of this class of animals move to slaughter in interstate commerce. The purpose of the amendment is to insure adequate screening of these animals as an essential part of cooperative disease eradication programs.

While there has been extensive review of the proposal with State officials and industry in the past, it will be published as a notice of proposed rule-making with a 60-day period for comments to insure that all interested parties have an opportunity to express their views. In fact, the Animal Health Division solicits the comments of all interested parties to insure that the regulations will provide maximum benefits with minimum restrictions.

WHAT PRODUCERS THINK ABOUT SWINE DISEASES

by
Roland Paul [1]

The answer to the question, "What do pork producers think about swine diseases," is they are against them.

The pork producer of the United States should be and are vitally interested in swine diseases. Swine diseases not only cost pork producers potential export markets but drastically cost them out-of-pocket money. The U.S. Department of Agriculture estimates that the annual loss from swine diseases during the past decade was more than 300 million dollars.

In answering a national poll conducted by the National Pork Producers Council, pork producers were asked to rank in order of "most urgent" 15 separate activities. They ranked (1) quality improvement, (2) improved hog marketing system, and (3) swine diseases. And, since swine diseases do affect quality, their interest in quality improvement may be interpreted as interest in swine diseases.

Another show of sincere interest was expressed by Iowa pork producers last year after they visited with officials at Iowa State University and studied research being conducted at that institution. Having decided that more swine disease research work was needed, the pork producers launched a drive to collect $80,000 from producers on a voluntary basis. The interest was so tremendous that a total of $87,000 was collected.

On several occasions the Illinois Pork Producers Association have been successful in appearing before their legislature to request funds for transmissible gastroenteritis (TGE) research facilities and for other swine disease research.

Pork producers in the past year have made several trips to Washington to testify on behalf of increased swine disease research funds. Also, when invited, pork producers have spearheaded many of the disease eradication committees on the State level.

One of the first committees appointed by the National Pork Producers Council was a production committee, with swine diseases definitely being one of the important items. After reading reports on disease eradication programs and noting that on numerous occasions pork producers have been challenged to show an interest, I am here to notify you that pork producers are ready and willing to meet the challenge and are definitely going to do so. The pork producer in the last 5 years is a different businessman that the producer of past years.

The problem of controlling and eradicating swine diseases seems to be the same as that in many other programs--that of communication between the research people, the regulatory people, and the producer. All too often, I am sure, the research and regulatory people are well informed of the facts and procedures in controlling and eradicating swine disease and the importance of doing so. However, this information has not been received by the rank and file of the producers. This

[1] Executive Vice President, National Pork Producers Council, Des Moines, Iowa.

communication problem definitely can be helped by involving the local and State swine producer boards in the formulation and execution of these programs and giving them the responsibility of notifying their fellow producers.

The role of producer, both physically and financially, is becoming more and more important each year as it appears we will receive less and less support financially from USDA, for extra-mural support for livestock disease.

The National Pork Producers board, at their last board meeting, approved expenditure of $2,500 producer funds for a pilot trichinosis project in cooperation with Livestock Conservation, Inc., the National Livestock and Meat Board, and the U.S. Department of Agriculture.

REPORT OF THE SUBCOMMITTEE ON RESEARCH

by
C. A. Manthei, Chairman[1]

Vaccination of Cattle

Strain 19 Vaccine: This part of the report is a continuation of the one presented last year on the effects of vaccinating heifer calves from 2 to 8 months of age.

The table below is a summary of immunologic responses of Strain 19 vaccinated heifers that were challenged during their first pregnancy.

Age at Time of Vaccination	Number of Cattle	Percent of Infection	Percent of Abortions
2 months	10	30.0	20.0
3 months	49	36.7	22.4
4 months	38	28.9	13.2
6 months	39	25.6	17.9
8 months	36	30.6	19.4
Controls	56	87.5	71.4

These results show that there is no significant difference in the degree of vaccinal immunity of heifers vaccinated at 3, 4, 6, or 8 months of age. Although the immunity of heifers vaccinated at 2 months of age was comparable to those vaccinated at older ages, more data on vaccination at this or younger ages will be needed before definite recommendations can be made. All of the heifers were given a comparable exposure dose of virulent Brucella abortus during their pregnancy or when they were 18 and 22 months of age.

Another effect of vaccinating heifer calves from 2 to 8 months of age, equally important as the immunologic response, is the rapid decline of vaccinal titers in calves vaccinated at 4, 3, and 2 months of age. Based on data available to the Subcommittee, 96.5 percent of the 4-month vaccinates, 100 percent of the 3-month vaccinates, and 100 percent of the 2-month vaccinates were classified negative with the conventional interpretation of the standard agglutination tests by the time the heifers were 12 months of age, and all were negative at 16 months of age. By using the same interpretation, of the 6-month vaccinates, 87.5 percent were classified as negative and 12.5 percent as suspects, and of the 8-month vaccinates, 67 percent were classified as negative and 33 percent as suspects when calves were 18 months of age. If the modified interpretation of the standard agglutination tests for calf-vaccinates is used, all of these heifers were classified as negative when 18 to 21 months of age, except one 8-month vaccinate.

[1] Director of the U.S. Department of Agriculture's National Animal Disease Laboratory at Ames, Iowa. Other members of the Subcommittee are: Robert K. Anderson, I. H. Borts, Norman B. McCullough, and S. H. McNutt.

An additional effect associated with vaccination is the persistence of Strain 19 in the udders (usually one quarter) of an exceedingly small percentage of cattle. The following information developed on this subject at the University of Wisconsin is a quote from a letter that I received from B. H. Espe:

"Strain 19-like organisms have been isolated from 35 animals in 33 herds since December of 1962. With one exception these have been isolations from the milk. The one animal from which this organism was isolated from tissues was a beef cow, and adequate milk samples were not obtained. The way that an incidence of persistent infection was figured is as follows: Wisconsin vaccinates an average of 550,000 calves each year, and we have isolated approximately 10 Strain 19-like organisms per year; therefore, the rate of isolation is 1.8 per 100,000 calves vaccinated. This rate was adjusted to 2.8 per 100,000 on the assumption that there was a 35 percent loss of calves due to death, exportation, etc. Our ability to isolate this organism is not good as for field infection (usually very small numbers of organisms shed in the milk) and we feel that isolations are made from about 50 percent of the cows with the typical history. Therefore, the maximum rate would be 5.6 per 100,000 calves vaccinated. These rates have been calculated on the total numbers of calves vaccinated per year but to be more meaningful should be calculated on the number of over-age vaccinates. Eighty-five percent of the isolates were made from animals which were 8 months of age or over at the time of vaccination."

In addition to the data supplied by Dr. Espe, Margaret Meyer reported that a high percentage of the isolations of Strain 19 from milk were made from Jerseys and Guernseys. These data, as well as that in the preceding paragraph, demonstrate that persistence of Strain 19 in vaccinated cattle is associated with sexual maturity which is directly related to vaccination of calves that are 8 months or more of age. Regardless of these findings, there is no evidence to indicate that nonvaccinated susceptible cattle become infected through natural routes of exposure to vaccinated cattle infected with Strain 19. This, however, is no justification for continuing present vaccination practices that impede progress in eradication of bovine brucellosis and create a potential public health regardless of how remote it may be.

In summary, vaccination of heifer calves at ages less than 8 months and preferably less than 6 months will produce a serviceable immunity against brucellosis, practically eliminates significant vaccinal titers within 12 months after vaccination, and reduces the probability of localization of Strain 19 in the udder.

Strain 45/20 Vaccine: A complete review of the literature on the use of a killed 45/20 adjuvant vaccine in cattle did not reveal any new information except inconsistency of results reported by different investigators. Factors that could be responsible for inconsistency of results are source of the cattle, handling of 45/20 cultures, preparing the vaccine, applying the vaccine, handling of exposure cultures, exposure procedures and dosage, isolation of animals after exposure, and method of evaluating immunity. The first report showing evidence that killed 45/20 adjuvant vaccine produced a serviceable immunity in cattle against brucellosis was published by McDiarmid in 1962. A second report of the comparative immunologic effectiveness of four vaccines (killed Brucella abortus strain 45/20 adjuvant, killed Brucella melitensis strain H. 38 adjuvant, live Brucella abortus strain 19, live Brucella melitensis strain Rev. 1) in cattle against virulent Brucella abortus was published by Renoux in 1964. He found that 45/20 vaccine produced an insignificant degree of immunity and the other three vaccines produced a comparable, serviceable immunity. A third report was given at the 1966 meeting of the USLSA comparing the immunologic efficiency of killed Strain 45/20 and live Strain 19 vaccines in cattle by Powell, Hendricks, and Roebuck. Killed Strain 45/20 adjuvant vaccine produced a serviceable immunity throughout the first pregnancy in cattle that were vaccinated at 6 and 9 months of age but an unsatisfactory immunity in cattle vaccinated at 3 and 6 months of age.

Other limitations related to the use of killed Strain 45/20 vaccine in this country are (1) two initial injections, approximately 6 to 12 weeks apart, required to produce immunity and (2) annual revaccination will be required until more is known about the length of time that a serviceable immunity persists.

Killed Strain 45/20 adjuvant vaccine did not produce sero-agglutination titers above the suspect level.

Swine Brucellosis

Diagnosis: Research on the comparative evaluation of serological tests for the diagnosis of swine brucellosis has been in progress at the National Animal Disease Laboratory during the past 3 years. These tests were standard tube and plate agglutination, 56° C. heat inhibition, acidified plate antigen, Combs, rivanol, mercaptoethonal, Brucellosis Card, and complement-fixation tests on 700 serums from 65 experimentally infected swine. The effectiveness of the tests was based on bacteriologic proof of infection.

None of the tests detected all of the infected swine, principally because a small percentage of infected swine do not develop significant titers or develop titers that recede rapidly below the diagnostic level even though infection persists.

The Brucellosis Card, acidified-plate antigen (pH 4.0), and 56° C. heat inhibition tests were comparable in identifying infected swine. All three are nearly as sensitive and more specific than the standard-tube and plate-agglutination tests. Of the three, the Card test may eventually be the one of choice for diagnosing brucellosis of swine, principally because of its greater simplicity of operation and interpretation. All or some of the other less sensitive, but more highly specific, tests may be used to supplement the Card test that failed to identify approximately 5 percent of the infected swine identified by the standard tube and plate agglutination tests.

Status of the Canine Epidemic Abortion Organism

In 1966 a Brucella-like organism was isolated from aborting beagles and subsequently established as the cause of epidemic canine abortion. This organism has many of the morphological, cultural, and biochemical attributes of members of the genus Brucella, but does not agglutinate in antisera prepared against smooth cultures of Br. abortus, Br. suis, or Br. melitensis (nor vice versa). It does reciprocally cross-agglutinate to a high degree with Br. ovis, the agent of ram epididymitis. In gel diffusion tests, antigens in common with both rough and smooth Brucella (presumably antigens not represented on the surface of smooth organisms) have been demonstrated.

In an attempt to determine more critically the relationship of this organism to the genus Brucella, deoxyribonucleic acid (DNA) hybridization studies have been done. In reciprocal competition tests employing the binding of single stranded, radiolabeled DNA fragments to immobilized single stranded homologous DNA, the DNA of the canine organism is indistinguishable from that of the recognized members of the genus Brucella. DNA from members of five other bacterial genera tested failed to compete in these systems. On the basis of this evidence, together with the relatedness shown by more classical methods, the canine organism will be considered for classification as a new member of the genus Brucella. It has been designated Br. canis by Carmichael and Bruner.

During these studies, the relationship of Br. ovis to members of the genus Brucella was further investigated. It was previously reported that DNA from Br. ovis was closely similar to but distinguishable from the DNA of Br. abortus, Br. suis, Br. melitensis, and Br. neotomae. It is similarly related to Br. canis. Further, it has been shown in reciprocal competition tests that this difference does not reside in a unique fragment of Br. ovis DNA. Brucella DNA competed completely with that from Br. ovis in a Br. ovis homologous system, but not vice versa. Thus, Br. ovis appears to lack some of the DNA sequences present in other members of the genus Brucella, including Br. canis.

BRUCELLOSIS IN THE UNITED STATES AND ABROAD

by

James H. Steele, Chairman[1]
Subcommittee on Public Health of the National Brucellosis Committee

Summary

Thirty-five States reported a total of 248[2] cases of brucellosis in 1967--14 less than those in 1966. The downward trend in reported cases began in 1947 and leveled off during 1962-63-64 at around 409 cases. A subsequent downward course leveled off in 1965 and 1966 at 262 cases. However, the decline was again evident in 1967 (fig. 1).

Brucellosis surveillance reports on 207 cases were sent to the Zoonoses Surveillance Unit, National Communicable Disease Center (NCDC), Atlanta, Ga. Fifty-two percent (107 cases) of these patients were packinghouse workers.

Human Brucellosis in the United States

Geographic and Temporal Distribution (tables 1 and 2, figs. 1 and 2)

In 1967, 248 cases were reported by 35 States. In 1966, 38 States reported 262 cases. No cases were reported in 1966 or 1967 by either the District of Columbia or Puerto Rico.

Four of the States reporting cases in 1967 did not report cases in 1966. On the other hand, seven States reporting cases in 1966 did not report cases in 1967. Eight States reported the same number of cases in 1966 as in 1967. Eight other States did not report cases in 1966 or 1967.

In 1967, Iowa reported the greatest number of cases--35--by an individual State. In proximate succession were Virginia, Texas, and California, with 29, 27, and 21 cases, respectively.

Kansas reported 10 cases in 1966, but none in 1967.

Cases for 1967 were computed on a rate basis (table 2). All States had rates of less than 1 per 100,000 population, except Alaska which had 2.2, and Iowa, 1.27.

Seasonal trends of human brucellosis in 1967, by date of report, revealed June to be the month of highest reporting--35 cases. The lowest number of cases--12--was reported in February (fig. 2).

---

[1] Chief, Veterinary Public Health Section, National Communicable Disease Center, U.S. Department of Health Education and Welfare, Atlanta, Ga. Other members of the Subcommittee are: Stanley L. Hendricks, Robert N. Barr, Samuel P. Leinback, Everette F. Baker, and Dario T. Cappucci, Jr.

[2] Preliminary data compiled from National Morbidity Reports.

TABLE 1.--Reported Human Brucellosis By Year and State, 1962-1967

State	1962	1963	1964	1965	1966	1967[1]
Alabama	7	5	4	2	2	[2]2
Alaska	2	-	-	-	-	[2]6
Arizona	[2]6	4	2	3	1	-
Arkansas	[2]11	9	6	10	4	3
California	[2]28	19	21	16	14	21
Colorado	-	-	-	1	1	2
Connecticut	[2]2	-	-	(3)	2	2
Delaware	(2)	-	-	-	-	-
District of Columbia	1	-	-	-	-	-
Florida	7	4	5	4	3	3
Georgia	[2]14	17	16	10	7	6
Hawaii	1	2	-	1	1	3
Idaho	[2]1	1	2	4	-	1
Illinois	57	26	[2]26	18	13	9
Indiana	[2]5	5	1	3	-	3
Iowa	105	155	114	78	[2]41	35
Kansas	22	[2]8	6	4	10	-
Kentucy	1	[2]4	6	1	1	4
Louisiana	10	10	5	5	8	4
Maine	(2)	[3]1	-	1	-	-
Maryland	[2]2	-	-	-	2	2
Massachusetts	[2]1	-	2	4	[3]4	-
Michigan	[2]6	6	6	1	1	[3]7
Minnesota	14	11	10	8	12	12
Mississippi	2	2	3	1	14	6
Missouri	4	[2]14	10	12	9	8
Montana	1	1	(2)	-	-	1
Nebraska	15	6	13	5	10	8
Nevada	(2)	-	-	-	(3, 4)	-
New Hampshire	[3]1	-	-	-	-	-
New Jersey	[2]1	1	-	1	2	3
New Mexico	(2)	1	1	-	1	2
New York	[2]5	9	5	3	4	[3]4
North Carolina	(2)	6	3	5	2	2
North Dakota	2	1	2	[2]2	1	2
Ohio	1	-	[2]5	3	1	-
Oklahoma	7	5	8	9	14	6
Oregon	[2]2	3	2	1	1	3
Pennsylvania	[2]2	3	4	2	2	9
Rhode Island	(2)	-	(3)	1	-	-
South Carolina	(2)	-	-	-	-	-
South Dakota	15	12	22	11	2	2
Tennessee	[2]10	10	7	3	10	9
Texas	10	16	35	7	19	27
Utah	[2]5	5	[3]26	-	1	-
Vermont	[2]1	1	-	[3]1	(4)	-
Virginia	[2]13	12	21	9	32	29
Washington	(2)	-	-	1	[3]2	-
West Virginia	(2)	-	-	2	2	-
Wisconsin	[2]8	11	12	[3]8	6	2
Wyoming	1	1	-	1	-	-
TOTALS	409	407	411	262	262	248

[1] Preliminary data. [2] Modified certified brucellosis States. [3] Certified brucellosis-free area. [4] Validated Swine brucellosis free States.

Sources: National Morbidity Report and U.S.D.A., Agricultural Research Service, Animal Health Division.

TABLE 2.--Human brucellosis cases

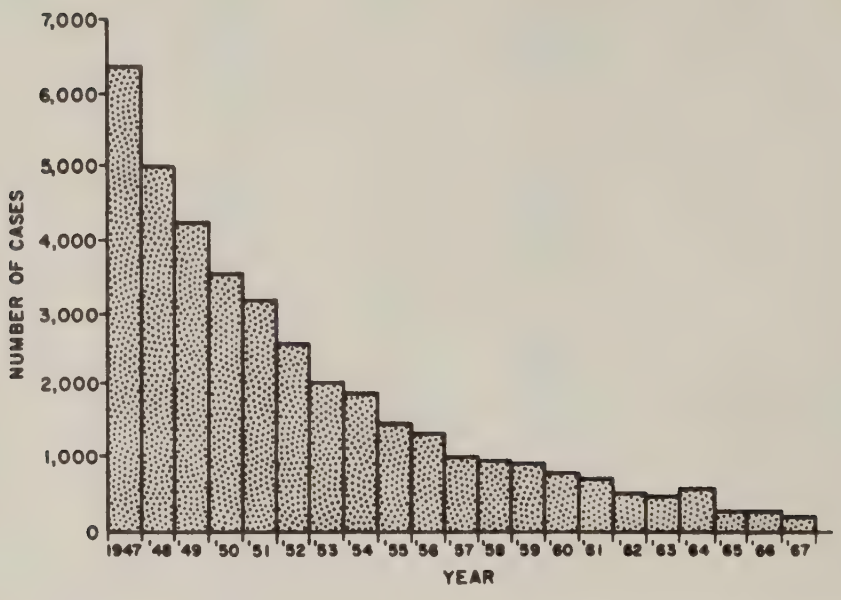
State	Number of cases in population				Comparison of Numbers of cases reported in 1967[1] with 1966
	Year 1966		Year 1967[1]		
	Total cases	Rate per 100,000 population	Total cases	Rate per 100,000 population	
Alabama	2	0.06	2	0.06	
Alaska	-	-	6	2.20	+6
Arizona	1	0.06	-	-	-1
Arkansas	4	0.20	3	0.15	-1
California	14	0.07	21	0.11	+7
Colorado	1	0.05	2	0.10	+1
Connecticut	2	0.07	2	0.07	
Delaware	-	-	-	-	
District of Columbia	-	-	-	-	
Florida	3	0.05	3	0.05	
Georgia	7	0.16	6	0.13	-1
Hawaii	1	0.14	3	0.40	+2
Idaho	-	-	1	0.14	+1
Illinois	13	0.12	9	0.08	-4
Indiana	-	-	3	0.06	+3
Iowa	41	1.49	35	1.27	-6
Kansas	10	0.44	-	-	-10
Kentucky	1	0.03	4	0.13	+3
Louisiana	8	0.22	4	0.11	-4
Maine	-	-	-	-	
Maryland	2	0.06	2	0.05	
Massachusetts	4	0.07	-	-	-4
Michigan	1	0.01	7	0.08	+6
Minnesota	12	0.34	12	0.34	
Mississippi	14	0.60	6	0.26	-8
Missouri	9	0.20	8	0.17	-1
Montana	-	-	1	0.14	+1
Nebraska	10	0.69	8	0.56	-2
Nevada	-	-	-	-	
New Hampshire	-	-	-	-	
New Jersey	2	0.03	3	0.04	+1
New Mexico	1	0.10	2	0.20	+1
New York	4	0.02	4	0.02	
North Carolina	2	0.04	2	0.04	
North Dakota	1	0.15	2	0.31	+1
Ohio	1	0.01	-	-	-1
Oklahoma	14	0.57	6	0.24	-8
Oregon	1	0.05	3	0.15	+2
Pennsylvania	2	0.02	9	0.08	+7
Rhode Island	-	-	-	-	
South Carolina	-	-	-	-	
South Dakota	2	0.29	2	0.30	
Tennessee	10	0.26	9	0.23	-1
Texas	19	0.18	27	0.25	+8
Utah	1	0.10	-	-	-1
Vermont	-	-	-	-	
Virginia	32	0.71	29	0.64	-3
Washington	2	0.07	-	-	-2
West Virginia	2	0.11	-	-	-2
Wisconsin	6	0.14	2	0.05	-4
Wyoming	-	-	-	-	
U.S.A.	262	0.13	248	0.13	-14
Puerto Rico	-	-	-	-	

[1] Preliminary data.

Sources: National Morbidity Reports and Current Population Reports.

Figure 1.

REPORTED HUMAN BRUCELLOSIS
UNITED STATES, 1947-1967

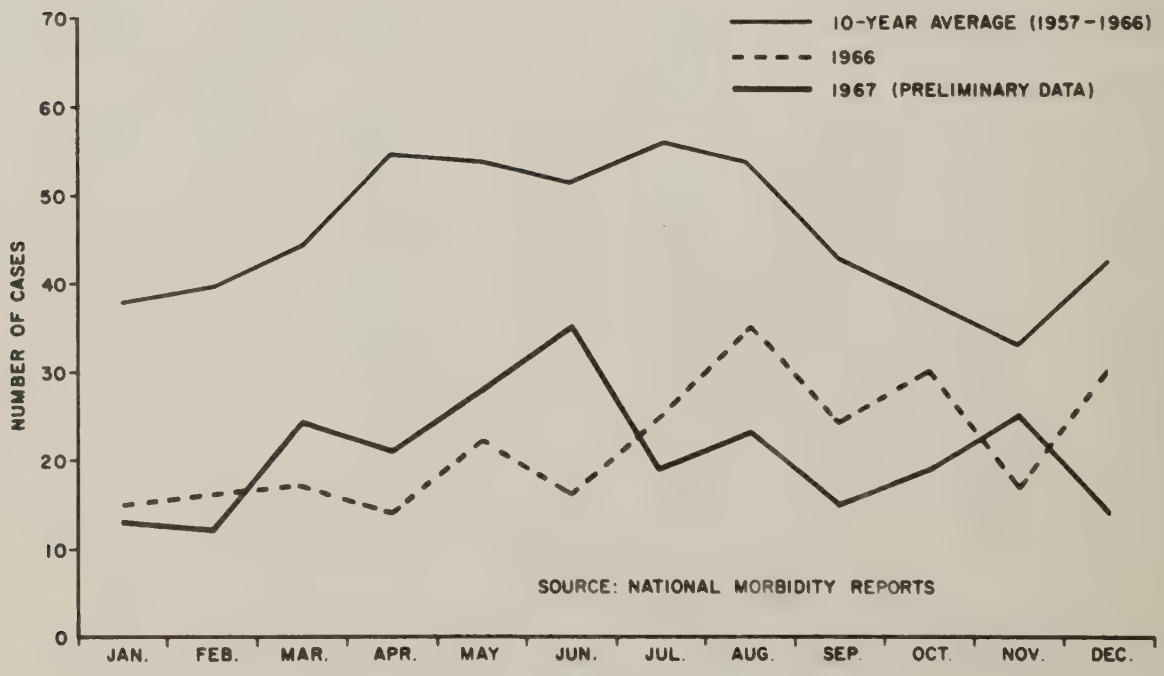


*PRELIMINARY DATA

SOURCE: NATIONAL MORBIDITY REPORTS

Figure 2.

SEASONAL TRENDS OF
REPORTED HUMAN BRUCELLOSIS



Age and Sex Distribution (table 3)

For 1967, as in previous years, the majority (181) of the 207 cases (87 percent) submitted to the Zoonoses Investigations Unit occurred in males. The young adult and middle-aged male groups had the highest involvement. In the women, there were no significant differences in the age distribution of cases.

TABLE 3.--Cases of brucellosis by age group and sex, United States, 1967[1]

Age group	Sex		Total
	Male	Female	
0-4	-	-	-
5-9	4	3	7
10-14	3	2	5
15-19	6	2	8
20-24	25	2	27
25-29	20	2	22
30-34	24	-	24
35-39	19	2	21
40-44	20	1	21
45-49	16	3	19
50-54	14	3	17
55-59	8	3	11
60-64	8	-	8
65 +	5	1	6
Unknown	9	2	11
TOTAL	181	26	207

[1] Preliminary data.

Source: Case reports submitted to the NCDC Zoonoses Investigations Unit.

Occupational Distribution and Sources of Infection (tables 4 and 5)

Fifty-two percent (107 cases) of the 207 cases, for which epidemiological reports were submitted, occurred in packinghouse workers. The number of cases in this group was higher in 1967 than in either 1965 or 1966, 89 and 93 cases, respectively.

Of the 107 packinghouse workers, 51 (48 percent) were exposed to swine as the most likely source of infection. Sources of infection for the other 56 (52 percent) abattoir workers is as follows: Cattle exposure, 14 cases; cattle and swine exposure, 34 cases; goat or sheep exposure, 1 case; and unknown exposure, 7 cases.

A major brucellosis outbreak took place during the period June 1966 through May 1967. Forty-three cases of brucellosis occured in a single Virginia meat plant which processed both cattle and swine (17).[3] Investigation of this outbreak is continuing.

Twenty-four of the 207 cases (12 percent) occurred in farmers. Unlike packinghouse workers, who had swine as their most probable infective source, one-half of the 24 cases in farmers were

[3] Underscored numbers in parentheses refer to Literature Cited at end of report.

TABLE 4.--Human brucellosis cases in packinghouse workers, United States, 1958-1967[1]

Year	Total cases reviewed	Cases in packinghouse workers	Percent of total
	Number	Number	
1958.....	369	104	28
1959.....	658	155	24
1960.....	555	221	40
1961.....	413	174	42
1962.....	276	115	42
1963.....	257	122	47
1964.....	322	139	43
1965.....	207	89	43
1966.....	224	93	42
1967.....	207	107	52

[1] Preliminary data.

Source: Case Reports Submitted to the NCDC Zoonoses Investigations Unit.

TABLE 5.--Human brucellosis cases, 1967[1], occupation and probable source of infection

Classification	Occupation	Probable source of infection								
		Swine	Cattle	Cattle and swine	Sheep or goat	Raw milk	Accident or laboratory	Other and unknown	Total	Recrudescence
Animal Industry employees	Packinghouse	51	14	34	1	-	-	7	107	9
	Rendering plant	-	-	1	-	-	-	-	1	-
	Stockyard	1	1	-	-	-	-	-	2	-
Farmers.....	Livestock	3	8	4	-	-	1	1	17	1
	Dairy	-	4	-	-	-	-	-	4	-
	Unspecified	-	-	-	-	-	-	3	3	1
Other categories...	Housewives	-	2	-	-	2	-	5	9	-
	Veterinarians	2	3	1	-	-	4	-	10	3
	Other	1	8	7	-	7	3	20	46	7
Unknown		-	-	-	-	1	-	7	8	2
TOTAL		58	40	47	1	10	8	43	207	23

[1] Preliminary data.

Source: Case reports submitted to the NCDC Zoonoses Investigations Unit.

related solely to exposure to cattle. Only three farmers gave histories of exclusive contact with swine. Four livestockmen had contact with both cattle and swine. One case resulted from accidental inoculation with Strain 19 vaccine. Source of infection for four other cases were unknown.

Of the 207 cases (5 percent), 10 involved veterinarians. Exposure to infected animals was documented in six cases. Four accidental exposures with Strain 19 were also reported among the veterinary profession. Of the 207 cases (5 percent), 10 had histories of ingesting raw milk. Recurrent brucella infections were noted in 23 (11 percent) of the 207 cases.

In eight of the 207 surveillance reports (4 percent), infection was shown as probably occurring in humans when they resided or traveled abroad: Mexico, four cases; Egypt, one case; Jamaica, one; Puerto Rico, one; and the Netherlands, one. In all eight cases the comsumption of unpasteurized milk or goat milk cheese was established.

Six cases, all involving Alaskan Eskimos, were exposed to caribou (Rangifer tarandus) as the source of infection. In the medical histories of these six patients, there were known instances of handling caribou carcasses or eating raw meat derived from them.

Animal Brucellosis in the United States

Swine

As of December 31, 1967, 144 counties in the United States had achieved brucellosis validation. (Certification of swine herds is based upon two negative serologic tests, on all animals 6 months or older, 30 to 90 days apart.) Validation status was established in 1966 in Nevada, Utah, and Vermont.

Abortion remains the most serious complication of brucellosis in pigs. However, the majority of pregnant swine infected with brucella do not abort (6).

Cattle

In 1967, Michigan and New York became certified brucellosis-free areas. (Certified brucellosis-free areas are defined as locations not having more than 1 percent of the herds, nor more than two-tenths of 1 percent of the cattle, infected or reactors.) Alabama and Alaska advanced to modified-certified status. (Modified-certified locations are considered to have not more than 1 percent of the cattle, nor more than 5 percent of the herds, testing positive.) As of December 31, 1967, of the total 3,153 U.S. counties, 942 had achieved certified-free status. The Virgin Islands were certified free in 1964.[4]

Research trials have shown that bovine vaccination at younger ages, with Strain 19, decreases the probability of persistent postvaccinal agglutinin titers. Redman, Deyoe, and King (14) compared the resistance to brucella infection and persistence of Strain 19 vaccination titers in pregnant animals vaccinated at 2 and 3 months of age with those of heifers immunized at 4 to 8 months of age. Comparative data indicated postvaccinal tube agglutinin titers from heifers vaccinated when 2 to 3 months of age were lower and receded sooner to a negative status and that the animals were as resistant to infection as cattle vaccinated when 4 to 8 months old. The U.S. Department of Agriculture has lowered the minimum age for vaccinating heifer calves with Strain 19 from 4 to 3 months (2).

[4] Schilf, E. A., Personal Communication, U.S.D.A., Agricultural Research Service, Animal Health Division, Hyattsville, Md., 1968.

Sheep

Epizootics of Brucella abortus infection in sheep are rare in North America. However, infection in a flock of 34 sheep was reported in 1967 (9). Abortions and the birth of weak lambs were noted in two consecutive lambing seasons. Brucella-infected cattle were incriminated, as well as other factors in spreading the disease. The importance of inter-species transfer of infection among different farm animals is stressed by the authors.

Dogs

Carmichael cited field data wherein brucellosis occurred in both male and female dogs, (5). Abortions occurred in bitches, and afflicted studs became sterile. Although beagles were mentioned most often in reports submitted to the author's laboratory, other breeds are known to be susceptible. It should be emphasized that the disease is widespread; however, the highest prevalance were found in field trail dogs. The author stated that canine brucellosis does not appear to be a problem in family dogs.

Laboratory and Wild Rodents

Thorpe and coworkers (15) studied the differences in susceptibility of laboratory mice, guinea pigs, rabbits, and 12 species of wildlife to brucella organisms. Eight species of mice were relatively susceptible to Br. abortus, Br. melitensis, Br. neotomae, and Br. suis; however, three species of rat, two species of rabbit, and squirrels were more resistant.

There was chronic persistence of serologic agglutinins and viable organisms in body tissues of rodents. Live organisms were determined to be present in desert wood rats (Neotoma lepida) up to 2 years after bacterial exposure. Agglutination titers of infected kangaroo rats (Dipodomys ordii and D. microps) resolved rapidly. Despite chronic infection by all four brucella species, the investigators had no evidence to indicate that the organisms were shed in animals' excreta or other body wastes. The authors did stress, however, the possible importance of rodents as reservoirs of brucellae.

The additional possibility of ectoparasitic vectors in the transmission of brucellosis was suggested because the authors found infected fleas (Orcheopsus sexdentatus) on an infected wood rat, and because bacteremias were observed frequently during the early periods of infection.

Caribou

In 1965 and 1966 no cases of human brucellosis were recorded for Alaska. In 1967 caribou were suspected as the probable source of brucella infection among six Alaskans.

It is interesting to note that 2 years ago eight cases of brucellosis in Alaskan Indians and Eskimos were described (4). The handling of caribou carcasses or the consumption of raw reindeer meat was noted in these cases. Skin reactions and sera titers were positive for brucella.

Huntley and coworkers (8) isolated a strain of brucella pathogenic for man from caribou. Furthermore, they found serological evidence to indicate brucellosis to be prevalent among Eskimos and Indians eating caribou.

In 1966, M. E. Meyer (12) presented her observations on brucella isolates from reindeer. She compared strains of brucella isolated from Eskimos and caribou in Alaska, Canada, and Russia, and found the strains indistinguishable from each other, irrespective of geographic origin.

Her suggestion, based on methods of classification by the "Subcommittee on Taxonomy of brucella of the International Committee of Bacteriological Nomenclature," was that the strain be considered as the fourth type of Br. suis.

Russian scientists have also studied brucellae from caribou (7). Parnas (13) agreed with previous Soviet studies in which it was stated that the reindeer strains represent a distinct species, Br. rangiferi. Vershilova (16) stated that this fourth species of brucella could be classified as a fourth type of Br. suis.

Brucellosis Topics From Abroad

Equine Brucellosis

McCaughey and Kerr (10) used the antiglobulin test (AG) to detect the presence of blocking antibodies in equine brucellosis. Blood sera from five horses with fistulous withers were tested by the AG, direct agglutination, and complement-fixation tests. For all five animals, the direct agglutination titers were lower than the Coombs' titers. Brucella abortus organisms were isolated from lesions in three of the cases.

Rev. 1 Vaccine

A review of the literature of the past 10 years on Rev. 1 vaccine was made by Alton and Elberg (1).

Some quotations regarding the use of Rev. 1 vaccine in goats were: (1) Its superiority over Strain 19 vaccine as an immunizing agent for goats; (2) one vaccination with Rev. 1 in kidhood gives life-time animal protection; (3) the agglutination test cannot be used to identify brucellosis in Rev. 1 vaccinated goats; and (4) on the islands of Malta and Gozo vaccination of goats with Rev. 1 is compulsory.

Favorable, widespread usage with Rev. 1 in sheep has been reported from trials in Iran, Israel, South Africa, Tunisia, and the USSR. Trials with cattle and monkeys have been minimal and preliminary. In humans, following vaccination with Rev. 1 organisms, agglutinator titers, dermal hypersensitivity, and symptomatic reactions were all present.

Brucella Isolations from Milk

Barrow and Peel (3) described a simple and economical technique of isolating brucella organisms from individual and bulk milk samples. The visible ring layers of positive milk ring-tests are removed via absorbent cotton-wool swabs and directly cultured onto plates of brucella agar media in vented petri dishes. By this method, they isolated Br. abortus from 369 of 2,984 samples of raw milk, as compared to 338 isolations by the direct culturing of gravity cream. The authors pointed out that if used in conjunction with the culture of gravity cream, the ring-test culture technique should significantly increase the overall total of brucella isolations.

Serological Investigations of Human Brucellosis

The serological findings from various testing procedures for brucella antibodies were described by Macdonald and Elmslie (11). Results on eight clinically acute cases of brucellosis in adults are given. Of the eight cases, one failed to show a confirmative titer by the standard agglutination procedure. Similarly, antibody titers from eight children with brucellosis were examined by the direct agglutination, complement-fixation, anti-human globulin, and mercaptoethanol tests. The latter three serological methods were considered indispensable in the diagnosis of some chronic brucella cases.

Literature Cited

(1) Alton, G. G., and Elberg, S. S.
1967. Rev. 1 Brucella melitensis vaccine, a review of ten years of study. Vet. Bul. 37 (11): 793-800.

(2) American Veterinary Medical Association
1967. Age lowered for vaccinating heifer calves for brucellosis. Jour. Amer. Vet. Med. Assoc. 151 (4): 499.

(3) Barrow, G. I., and Peel, M.
1967. The isolation of brucella organisms from milk by direct culture of ring-test reactions. Monthly Bulletin of the Ministry of Health Laboratory Service 26 (Sec. II): 192-196.

(4) Brody, J. A., Huntley, B., Overfield, T. M., and Maynard, J.
1966. Studies of human brucellosis in Alaska. Jour. Infect. Dis. 116 (3): 263-269.

(5) Carmichael, L. E.
1968. Brucella abortion in bitches. Jour. Amer. Vet. Med. Assoc. 152 (1): 35-56. (See also U.S. Dept. of Health, Education, and Welfare, National Communicable Disease Center, Annual Brucellosis Summary 1966, pp. 2-3.)

(6) Deyoe, B. L., and Manthei, C. A.
1968. Brucella abortion in swine. Jour. Amer. Vet. Med. Assoc. 152 (1): 38.

(7) Elberg, S. S.
1965. The Brucellae. In Bacterial and Mycotic Infections of Man, Chapter 28, p. 707. (Edited by R. D. Dubos and J. G. Hirsch, 4th ed.) J. B. Lippencott Co., Philadelphia.

(8) Huntley, B. E., Philip, R. N., and Maynard, J. E.
1963. Survey of brucellosis in Alaska. Jour. Infect. Dis. 112 (1): 100-106.

(9) Luchsinger, D. W., and Anderson, R. K.
1967. Epizootiology of brucellosis in a flock of sheep. Jour. Amer. Vet. Med. Assoc. 150 (9): 1017-1021.

(10) McCaughey, W. J., and Kerr, W. R.
1967. The Coombs' or antiglobulin test in the horse. Vet. Record 81 (21): 542.

(11) Macdonald, A., and Elmslie, W. H.
1967. Serological investigations in suspected brucellosis. Lancet 1 (7486): 380-382.

(12) Meyer, M. E.
1966. Identification and virulence studies of brucella strains isolated from Eskimos and reindeer in Alaska, Canada, and Russia. Amer. Jour. Vet. Res. 27 (116): 353-358.

(13) Parnas, J.
1966. The taxonomic properties of brucellae isolated from reindeer (Brucella rangiferi Pinigin-Meyer) Zentrbl. f. Veterinar-medizin 13B: 690-697. (Abstract No. 1121, Vet. Bul. 37 (4): 211.)

(14) Redman, D. R., Deyoe, B. L., and King, N. B.
1967. Resistance of cattle to Brucella abortus following vaccination at two and three months of age. Jour. Amer. Vet. Med. Assoc. 150 (4): 403-407.

(15) Thorpe, B. D., Sidwell, R. W., and Lundgren, D. L.
1967. Experimental studies of four species of brucella in selected wildlife, laboratory, and domestic animals. Amer. Jour. Trop. Med. and Hygiene 16 (5): 665-674.

(16) Vershilova, P. A., Ivanov, M. M., Orlov, E. S., and others.
1966. Review of studies on brucella cultures isolated from reindeer in the USSR. Veterinariya (Moscow) 43 (9): 15-18. (Abstract No. 1120 in Vet. Bul. 37(4): 211. 1967.)

(17) White, P. C., Jr., and coworkers.
1967. Brucellosis-Virginia. Weekly Morbidity and Mortality Rpt. 16. (35): 293 and 300.

PROPOSALS BY THE U.S. LIVESTOCK SANITARY ASSOCIATION ON BRUCELLOSIS ERADICATION

by
J. V. Smith, Chairman[1]

In presenting this report of the Brucellosis Committee, may I first express my sincere thanks to the members of this Committee who participated in discussions Monday afternoon, Tuesday morning, and Wednesday. These open meetings were well attended by livestock personnel and regulatory officials. As in the past, every one who desired to discuss a problem was given the opportunity to express himself to the fullest extent. The discussions have been most helpful to the Committee in preparing this report. The Committee trusts that this interest will continue. With your advise and recommendations, the goal of eradicating brucellosis by 1975 will be attained.

Since our last meeting, 180 counties have qualified as Certified Brucellosis-Free areas. One State, Washington, attained a Certified Brucellosis-Free status, and another State, Alaska, achieved a Modified Certified Brucellosis status. At this time, 39 States have qualified as Modified-Certified Brucellosis areas. Of these, 10 States and the Virgin Islands have gone on to reach the ultimate goal--a Brucellosis-Free status. There are now a total of 898 free counties. Nationally, 92 percent of the counties are now Modified Certified; 28.4 percent have achieved a Certified Brucellosis-Free status. Only 106 counties do not have an organized program underway to eradicate brucellosis.

Revision of Uniform Methods and Rules

The Committee discussed the problem of handling suspect animals in clean herds in Modified-Certified Brucellosis areas and Certified Brucellosis-Free areas.

The status of animals classified as suspects by the tube- or plate-agglutination tests should be determined by use of a supplemental test such as the Brucellosis Card test, rivanol test, mercaptoethanol tests, or others that have proven reliable.

Suspects to the tube- or plate-agglutination tests or both in herds that are otherwise negative will not be required to be retested for certification purposes providing the various supplemental tests are conducted on the blood sample, and it has been determined that infection does not exist.

In order to alleviate some of the problems associated with vaccination, the use of Brucella abortus Strain 19 vaccine should be limited to female calves from 3 to 8 months of age of either dairy or beef breeds. The definition of official vaccinate will be changed accordingly.

[1] State Veterinarian, Hartford, Conn. Other members of the Committee are J. R. Bishop, Tipton, Ind.; G. B. Estes, Richmond, Va.; W. D. Knox, Fort Atkinson, Wis.; A. E. Janawicz, Montpelier, Vt.; C. A. Manthei, Ames, Iowa; S. H. McNutt, Madison, Wis.; E. A. Schilf, Springfield, Va.; A. O. Wilson, Hysham, Mont.; C. E. Burch, Albany, N. Y.; J. B. Finley, Encinal, Tex.; D. E. Flagg, Bismarck, N. Dak.; R. Larramore, Gillette, Wyo.; R. J. McClenaghan, Ottawa, Canada; J. O. Pearce, Okeechobee, Fla.; W. C. Tobin, Denver, Colo.; and H. G. Wixom, Sacramento, Calif.

Testing of Official Vaccinates

Reconsideration was given to the age that official vaccinates should be subject to test. Based on effective procedures for preventing spread of brucellosis by infected vaccinates, it was recommended that official vaccinates be subject to test at 18 to 20 months of age, effective January 1, 1970. This ensures that the status of most infected vaccinates would be determined before they aborted or calved at full term.

Market Cattle Testing Results

Blood samples tested within the Market Cattle Testing program showing a titer to the standard plate or tube test should be subjected to supplemental testing as prescribed for suspect animals and the information provided to the state of origin of the animal tested.

Source of Brucella Antigen

The Committee reaffirms its previous recommendations that all antigen used in the cooperative program be prepared and provided by the United States Department of Agriculture, and that States take the necessary steps to limit the use of commercial antigen within their States.

Swine Brucellosis Eradication

As stressed in last year's report, the Committee urges that the United States Department of Agriculture move as rapidly as possible in the development of a market swine testing program and of regulations requiring that all breeding swine moved interstate be from Validated Brucellosis-Free herds or areas.

Animal Identification

The Committee urges the implementation of an animal identification procedure by the Federal Government requiring the backtagging of all breeding cattle moving interstate. The backtag would be applied at the first concentration point.

Interstate Movement of Cattle

The Committee reconfirms its recommendation that effective January 1, 1968, cattle moving into Modified-Certified Brucellosis areas and Certified Brucellosis-Free areas must originate from Modified-Certified Brucellosis areas or Certified Brucellosis-Free areas. The Committee also recommends that the proposed revisions to Part 78 Code of Federal Regulations be adopted in its entirety as originally printed except official vaccinates 18 to 20 months of age will be subject to test effective January 1, 1969, thus affording industry an opportunity to review and conform to the proposed revisions.

RECOMMENDATIONS OF THE NATIONAL BRUCELLOSIS COMMITTEE

by
Bob Laramore, Acting Chairman[1]

The National Brucellosis Committee recommends:

1. That considerations to maintain or to dissolve the National Brucellosis Committee be tabled for further consideration.

2. That the Committee write a letter to R. J. Anderson, Associate Administrator of the Agricultural Research Service, U.S. Department of Agriculture, recommending that the effective date of the proposed change in the Brucellosis Regulation affecting the interstate movement of cattle be January 1, 1969, as intended by the Brucellosis Committee of the U.S. Livestock Sanitary Association.

3. That the Committee agrees in principle with the proposed changes in part 78.12 except the requirement that calves under 8 months of age, steers, and spayed heifers originating in non-certified areas from herds on record as not affected with brucellosis be tested and found negative within 30 days before their movement interstate.

Nominating Committee Report

The Nominating Committee of the National Brucellosis Committee composed of C. A. Manthei, Archie Wilson, and Sam McNutt presented the following slate of officers all of whom were elected for terms by the Committee:

Officers	Executive Committee	Board of Directors (1968-1971)
Chairman: J. W. Ralph Bishop	Herman Aaberg	Mike Bay
	J. W. Ralph Bishop	S. H. McNutt
Vice-Chairman: J. B. Finley	W. J. Knox	Keith Meyers
	J. B. Finley	J. O. Pearce, Jr.
Secretary: R. Harvey Dastrup	C. A. Manthei	Dan E. Flagg
	S. H. McNutt	H. G. Wixom
Assistant Secretary: Mike Bay	J. H. Steele	Bob Laramore
	Archie Wilson	Roland Paul

[1] Vice-Chairman of the National Brucellosis Committee acting in the absence of Chairman Charles G. Scruggs.

YOUR STATE--FEDERAL ANIMAL HEALTH OFFICIALS

If you desire more detailed information on the brucellosis eradication program in your State, please contact the Federal Veterinarian in Charge, Animal Health Division, or the State Official in Charge of the animal disease program. Their addresses are listed below.

State or Territory	Federal Veterinarian in Charge	State Official
Alabama	A. G. Pass P. O. Box 1749 Montgomery, Ala. 36104	John G. Milligan P. O. Box 220 Montgomery, Ala. 36101
Alaska	Harold D. White Rooms 60-61, Federal Bldg. Anchorage, Alaska 99501	Fred S. Honsinger P. O. Box 2473 Juneau, Alaska 99801
Arizona	Ted Rea P. O. Box 7397 4004 North 7th Street Phoenix, Ariz. 85011	L. N. Butler 1521 W. Jefferson St. Phoenix, Ariz. 85007
Arkansas	Paul Becton P. O. Box 3548 Room 5506, Federal Bldg. Little Rock, Ark. 72203	R. M. Thomas State Police Headquarters Ground P. O. Box 2821 Little Rock, Ark. 72203
California	J. H. Wommack Room 4506 650 Capitol Avenue Sacramento, Calif. 95814	H. G. Wixom, Chief Division of Animal Industry 1220 N Street Sacramento, Calif. 95814
Colorado	R. W. Gerding 300 New Customhouse Bldg. Denver, Colo. 80202	William C. Tobin Room 420 1525 Sherman Street Denver, Colo. 80203
Connecticut	W. C. Ferrall Room 258-262 State Office Bldg. Hartford, Conn. 06115	Jean V. Smith Room 287 State Office Bldg. Hartford, Conn. 06115
Delaware	W. L. Rehkemper State Board of Agr. Bldg. P. O. Drawer D Dover, Del. 19901	E. L. Symington State Board of Agr. Dover, Del. 19901

State or Territory	Federal Veterinarian in Charge	State Official
Florida	J. B. Healy P. O. Box 35028 400 W. Bay Street Jacksonville, Fla. 32202	C. L. Campbell P. O. Box 1509 Tallahassee, Fla. 32301
Georgia	C. J. Mikel Room 410, Bona Allen Bldg. 133 Luckie St., N. W. Atlanta, Ga. 30303	J. F. Andrews Capitol Square Atlanta, Ga. 30334
Hawaii	E. G. Ongert 1481 South King St. Room 436 Honolulu, Hawaii 96814	Ernest H. Willers State Veterinarian P. O. Box 5425 Pawaa Station Honolulu, Hawaii 96814
Idaho	A. P. Schneider, Director Idaho State-Federal Coop. Livestock Regulatory Programs 716 Idaho Street Boise, Idaho 83702	A. P. Schneider (Same)
Illinois	Milo Johnson P. O. Box 2149 Springfield, Ill. 62705	Paul B. Doby Emmerson Bldg. State Fair Grounds Springfield, Ill. 62706
Indiana	L. R. Barnes 311 West Washington St. Room 210 Indianapolis, Ind. 46204	David L. Smith 801 State Office Bldg. 100 North Senate Ave. Indianapolis, Ind. 46204
Iowa	G. E. Blake 1115 Grand Avenue Des Moines, Iowa 50309	M. E. Pomeroy State Veterinarian State House Des Moines, Iowa 50319
Kansas	D. O. Manley P. O. Box 1518, Room 700 Capitol Federal Bldg. Topeka, Kans. 66601	A. G. Pickett Livestock Sanitary Commissioner State Office Bldg. Topeka, Kans. 66612
Kentucky	L. T. Fisher P. O. Box 399 105½ St. Clair Street Frankfort, Ky. 40601	R. J. Henshaw, Acting State Veterinarian Capitol Annex Frankfort, Ky. 40601

State or Territory	Federal Veterinarian in Charge	State Official
Louisiana	F. E. Henderson 1755 Florida St. 302 Audubon Bldg. Baton Rouge, La. 70821	F. B. Wheeler P. O. Box 4003 Capitol Station Baton Rouge, La. 70821
Maine	C. W. Wilder U.S. Post Office & Federal Building Augusta, Maine 04330	Francis G. Buzzell, Director State Office Annex Augusta, Maine 04331
Maryland	J. K. Atwell Room 510, Hartwick Bldg. 4321 Hartwick Road College Park, Md. 20740	T. A. Ladson, Director Md. Livestock Sanitary Service Symons Hall, Univ. of Maryland College Park, Md. 20740
Massachusetts	J. A. Zimmerman 802 Customhouse Bldg. Boston, Mass. 02109	Edward M. Dwyer, Director Division of Livestock Disease Control 100 Cambridge Street Boston, Mass. 02202
Michigan	C. L. Hendee Sixth Floor Lewis Cass Bldg. Lansing, Mich. 48913	John F. Quinn, State Veterinarian Sixth Floor Lewis Cass Bldg. Lansing, Mich. 48913
Minnesota	D. F. Werring 555 Wabasha Street St. Paul, Minn. 55102	J. G. Flint, Secretary and Executive Officer 1246 University Avenue St. Paul, Minn. 55104
Mississippi	L. J. Pate 400 Milner Bldg. Corner Lamar & Pearl Sts. Jackson, Miss. 39205	Vernon D. Chadwick, State Veterinarian P. O. Box 916 Jackson, Miss. 39205
Missouri	L. F. Van Gorder P. O. Box 1027 Jefferson City, Mo. 65101	G. C. Stiles, State Veterinarian P. O. Box 630 Jefferson Bldg., 13th Floor Jefferson City, Mo. 65102
Montana	J. H. Slack 200 Steamboat Block 616 Helena Avenue Helena, Mont. 59601	John W. Safford, State Veterinarian Livestock Building Capitol Station Helena, Mont. 59601

State or Territory	Federal Veterinarian in Charge	State Official
Nebraska	E. H. Nordstrom P. O. Box 1866 303 Farmers Mutual Ins. Bldg. 1220 J Street Lincoln, Nebr. 68501	Stanley Flora Room 1124-26 State Capitol Building Lincoln, Nebr. 68501
Nevada	E. M. Joneschild 1395 Haskell St., Suite B Reno, Nev. 89502	John L. O'Harra, Director P. O. Box 1209 Reno, Nev. 89502
New Hampshire	C. W. Wilder U.S. Post Office & Fed. Bldg. Augusta, Maine 04330	Clarence B. Dearborn Room 102, State House Annex Concord, N. H. 00331
New Jersey	R. L. Alkire Room 201 C Health and Agricultural Bldg. John Fitch Plaza Trenton, N. J. 08605	E. L. Brower John Fitch Plaza South Warren Street P. O. Box 1888 Trenton, N. J. 08605
New Mexico	R. L. Pyles P. O. Box 464 4010 New Fed. Office Bldg. 517 Gold Avenue, S. W. Albuquerque, N. Mex. 87103	J. E. Kleck Box 1296 113 Third St., S. W. Albuquerque, N. Mex. 87103
New York	Dale Suplee Building 8, State Campus Albany, N. Y. 12226	Grant S. Kaley, Director Building 8, State Campus Albany, N. Y. 12226
North Carolina	W. W. Harkins P. O. Box 2656 Raleigh, N. C. 27602	Thomas F. Zweigart P. O. Box 670 323 Agricultural Bldg. Raleigh, N. C. 27602
North Dakota	G. W. Spangler P. O. Box 639 220 East Rosser Avenue Bismarck, N. Dak. 58502	Dean E. Flagg State Capitol, Bldg. Bismarck, N. Dak. 58502
Ohio	Paul H. Kramer 438 Old Post Office Bldg. Third & State Streets Columbus, Ohio 43215	Harry E. Goldstein Room 720 Ohio Department Bldg. 65 South Front Street Columbus, Ohio 43215
Oklahoma	L. N. Miller 1421 Federal Bldg. 200 Northwest 4 Oklahoma City, Okla. 73102	J. H. Brashear 122 State Capitol Bldg. Oklahoma City, Okla. 73102

State or Territory	Federal Veterinarian in Charge	State Official
Oregon	O. J. Halverson 494 State Street Room 203 Salem, Oreg. 97301	Glen B. Rea, Chief Veterinary Division Oregon Dept. of Agr. Salem, Oreg. 97310
Pennsylvania	G. T. Mainwaring 2301 N. Cameron St. Harrisburg, Pa. 17108	J. C. Shook, Director Bureau of Animal Industry 2301 N. Cameron St., Rm. 408 Harrisburg, Pa. 17108
Rhode Island	(Same as Mass.)	T. J. Grennan, Jr., Chief Division of Animal & Dairy Industry 365 State Office Bldg. Providence, R. I. 02903
South Carolina	C. E. Boyd, Director State-Federal Livestock Disease Erad. Program P. O. Box 1771 Columbia, S. C. 29202	C. E. Boyd (Same)
South Dakota	H. P. Honstead P. O. Box 758 Pierre, S. Dak. 57501	M. D. Mitchell, Executive Secretary State Office Bldg. Pierre, S. Dak. 57501
Tennessee	W. W. Bird P. O. Box 510 Nashville, Tenn. 37202	C. E. Kord P. O. Box 9039 Melrose Station Nashville, Tenn. 37202
Texas	E. S. Cox Third Floor Western Republic Life Bldg. Austin, Tex. 78701	James B. Henderson Texas Animal Health Comm. New State Office Bldg. Austin, Tex. 78701
Utah	J. E. Rasmussen P. O. Box 11429 5237 Federal Bldg. 125 South State St. Salt Lake City, Utah 84111	Hendrick Verslius Room 412-A State Capitol Bldg. Salt Lake City, Utah 84114
Vermont	T. A. Gage State Agricultural Bldg. Montpelier, Vt. 05602	A. E. Janawicz, Director Vermont Livestock Division Department of Agriculture Montpelier, Vt. 05602

U. S. GOVERNMENT PRINTING OFFICE : 1968 O - 311-534

State or Territory	Federal Veterinarian in Charge	State Official
Virginia	E. C. Roukema 1444 East Main St., Room 204 Richmond, Va. 23219	W. L. Bendix, Director 203 N. Governor St. Richmond, Va. 23219
Washington	C. R. Omer P. O. Box 87 205 Union Ave. Bldg. Olympia, Wash. 98501	D. H. Spangler, Acting Supervisor Div. of Animal Industry P. O. Box 120 Olympia, Wash. 98501
West Virginia	L. G. Berg 3404 Federal Office Bldg. 500 Quarrier Street Charleston, W. Va. 25301	Director Room E, 102 Capitol Bldg. Charleston, W. Va. 25301
Wisconsin	A. A. Erdmann, Chief Vet. State-Federal Coop. Program Hill Farms State Office Bldg. 4802 Sheboygan Avenue Room B 280 Madison, Wis. 53702	A. A. Erdmann (Same)
Wyoming	W. M. Reynolds P. O. Box 825 1414 East 13th St. Cheyenne, Wyo. 82001	R. I. Port State Office Bldg. Cheyenne, Wyo. 82001
Puerto Rico	O. L. Kelsey Animal Health Division USDA-ARS G.P.O. Box 3488 San Juan, P. R. 00936	Miguel A. Hernandez Agosto Secretary of Agriculture and Commerce P. R. Department of Agriculture and Commerce San Juan, Puerto Rico 00936

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
HYATTSVILLE, MARYLAND 20782

OFFICIAL BUSINESS

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF AGRICULTURE